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COMPUTERWORLD

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D&B unites software rivals

BY NELL MARGOLIS
and AMY CORTESE
CW STAFF

Dun deal

Dun & Bradstreet's recent acquisition adds to its arsenal of services

The Dun & Bradstreet Corp.
◀ **Chairman:** Charles W. Moritz
1988 revenue: $4.3 billion
Employees: 70,000
Lines of business: Business information databases, software and services, publishing, market research and services

Management Science America, Inc.
Chairman: John P. Imlay Jr. ▶
1988 revenue: $250 million
Employees: 2,300
Software applications: Financial/accounting, human resources, manufacturing and education

NEW YORK — Management Science America, Inc., the Atlanta-based mainframe applications company that last year rejected a $191 million buyout offer, said yes last week to a $333 million bid by The Dun & Bradstreet Corp.

MSA, which turned down the lower bid by Computer Associates International, Inc., will be merged with its longtime competitor in the applications software arena, D&B division McCormack & Dodge.

If the deal is accepted by MSA stockholders, the two archrivals will be melded into Dun & Bradstreet Software Services. MSA Chairman and Chief Executive Officer John P. Imlay Jr. will then head the approximately $200 million D&B unit, which could command an estimated 80% of the mainframe business applications market.

"This marriage makes a lot more sense than many," said Jim Crotty, director of financial services at The Travelers Corp. and a longtime M&D customer. "Both parties have something to bring to the table." Specifically, M&D has the stronger product line while MSA has a more customer-oriented approach to sales and support, Crotty said.

While details on how the product lines would be merged, if

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LAN strategies: Don't junk that old mainframe just yet

BY ELISABETH HORWITT
CW STAFF

Although an increasing number of corporations are either moving or preparing to move strategic applications off their mainframes and onto local-area networks, few expect to relegate their big hosts to the scrap heap in the foreseeable future.

Instead, mainframes are being set up as centralized data repositories that provide the fresh, consistent data and applications that LAN servers then make available to local users.

Even while they were enthusiastic about bringing applications and data closer to the user via LAN servers, information systems managers cited strong reasons for not abandoning the corporate mainframes.

The city of New York, for example, hopes to eventually place "whatever [data and applications] a work group needs locally on a LAN" to cut down the number of user queries directed at the city's various data centers, according to Joseph Giannotti, commissioner for the city's Computer and Data Communications Services Agency.

The data centers are not going to go away, Giannotti emphasized. "We have 250,000 people on payroll. We process three million parking tickets. How do we put all that data on micros?" he asked. Instead, the city will try for a balance between "volumes of data that need to be

Continued on page 8

'OS/2 lite' pledge may fall flat

BY CHARLES VON SIMSON
CW STAFF

REDMOND, Wash. — Corporate planners skeptical of Microsoft Corp.'s ability to develop a low-end version of OS/2 will not find much optimism coming from the company's senior executives. The plan to develop a "lite" version of the operating system appears to have been hastily assembled for Comdex/Fall '89, and it is a plan to which Microsoft executives refuse to commit.

"We are trying to squeeze [OS/2] down, but right now we cannot commit to a 2M-byte version," said Peter M. Neupert, a senior general manager for OS/2 at Microsoft.

"Can we make 2 meg? I don't know," said Steve Ballmer, Microsoft's vice-president of systems software. "This thing is not without compromises."

Both Neupert and Ballmer maintained that the "loosely written" announcement was simply a statement that the 3M-byte version of OS/2 was not the best the company could do and that it reflected a recognition that the high memory requirements of DOS were a

Continued on page 10

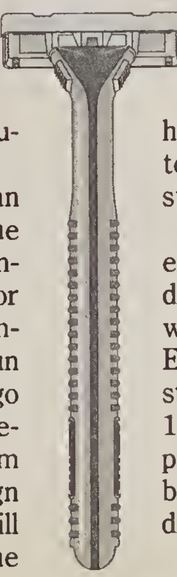
Systems give Gillette the razor's edge

BY CLINTON WILDER
CW STAFF

BOSTON — "The best a man can get" is about to get better — and information technology is a big reason why.

When Gillette Co. launches its ballyhooed Sensor razor in late January, its blockbuster Super Bowl ad probably will not feature computer-aided design workstations or a completely new production line running on Management Science America, Inc.'s AMAPS software. But Sensor, Gillette's first new razor product line in more than 10 years, could not be making its debut in two months without them.

"No one would think of doing engineering in this company without CAD, any more than you'd bring in a secretary without a word processor," said Peter Valorz, manager of blade and razor engineering computer-aided design and manufacturing systems.



Time to market can mean life or death in the consumer products industry, and the Sensor designers found themselves staring down a gun barrel 18 months ago when Gillette management ordered them to completely redesign the razor — and still meet deadlines for the January 1990 launch date.

"We had to start from scratch; the reaction was disbelief," Valorz recalled. "It was strictly a marketing decision. [The original] had an octagonal black plastic handle; it was not as high-tech or attractive as the style we're using."

Using Prime Computer, Inc.'s Calma three-dimensional CAD software running on Digital Equipment Corp. workstations linked to a VAX-11/785 host, Gillette's 10 product designers went back to their electronic drawing boards. While

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NEWSPAPER

SECOND CLASS

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"Excitement is one thing, and instability is another."

VIVIEN SPATHOPULOS
COMMERCE DEPARTMENT

On U.S. business opportunities in Eastern Europe. See story page 4.

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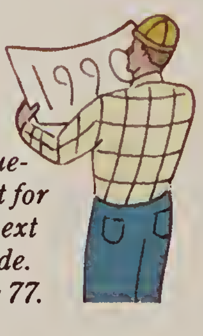
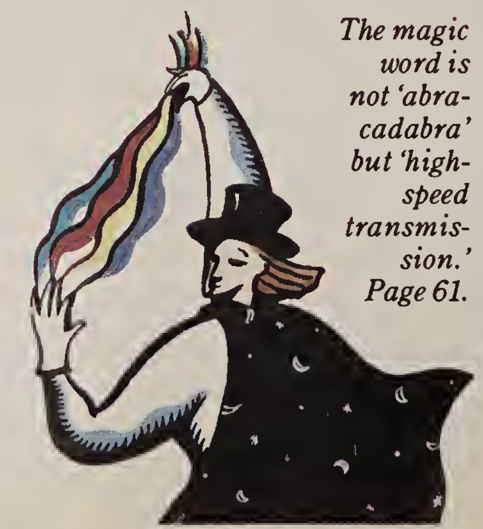
UPDATE

Cycle theory. In the year 1958, the U.S. was the No. 1 producer of every single consumer product — with one exception — and also led the world in production of all durable goods. We were even a net exporter of oil in that year, which will go down in history as our high watermark of the century. Today, our remaining clear dominance is in two areas, computer products and armaments. Of the top 20 publicly held firms in the world, only four are in the U.S. Oh yes, the lone product that kept us from a monopoly of world economic leadership in 1958? Bicycles! China wheeled ahead of the pack in that category.



A blueprint for the next decade. Page 77.



The magic word is not 'abracadabra' but 'high-speed transmission.' Page 61.

EXECUTIVE BRIEFING

■ **Mainframes are not dinosaurs.** Even with the growing number of applications moving from CPUs to local-area networks, IS executives say that mainframes retain a crucial role as central data repositories. Very large applications, such as airline reservation systems, payroll and direct-deposit checking, will continue to be mainframe-resident for the foreseeable future. **Page 1.**

■ **MSA and McCormack & Dodge,** the ultra-rivals of packaged mainframe applications, will merge in a $333 million acquisition of MSA by M&D parent Dun & Bradstreet. For now, both companies' product lines will be maintained and each firm's veteran CEO will stay at the helm. Customers expect some consolidation of products in the future but expressed confidence in potential migration tools. IBM will sell its 5% stake in MSA and will gain a seat on the new firm's board of directors. **Pages 1, 113.**

■ **The Bay Area Rapid Transit System** continued its rough IS ride last week, deciding not to renew its contract with vendor Logica Data Architects to finish its ill-fated automated routing system. In a contentious meeting, BART authorities, Logica and BART's auditors traded charges about flaws in the $40 million system. **Page 8.**

■ **Gillette's new Sensor razor** will hit the shelves in January with a big boost from CAD, factory-floor automation and manufacturing control technology. A user-led project team implemented a revamped production line, while designers used three-dimensional CAD to completely change the look and feel of the product in 18 months. **Page 1.**

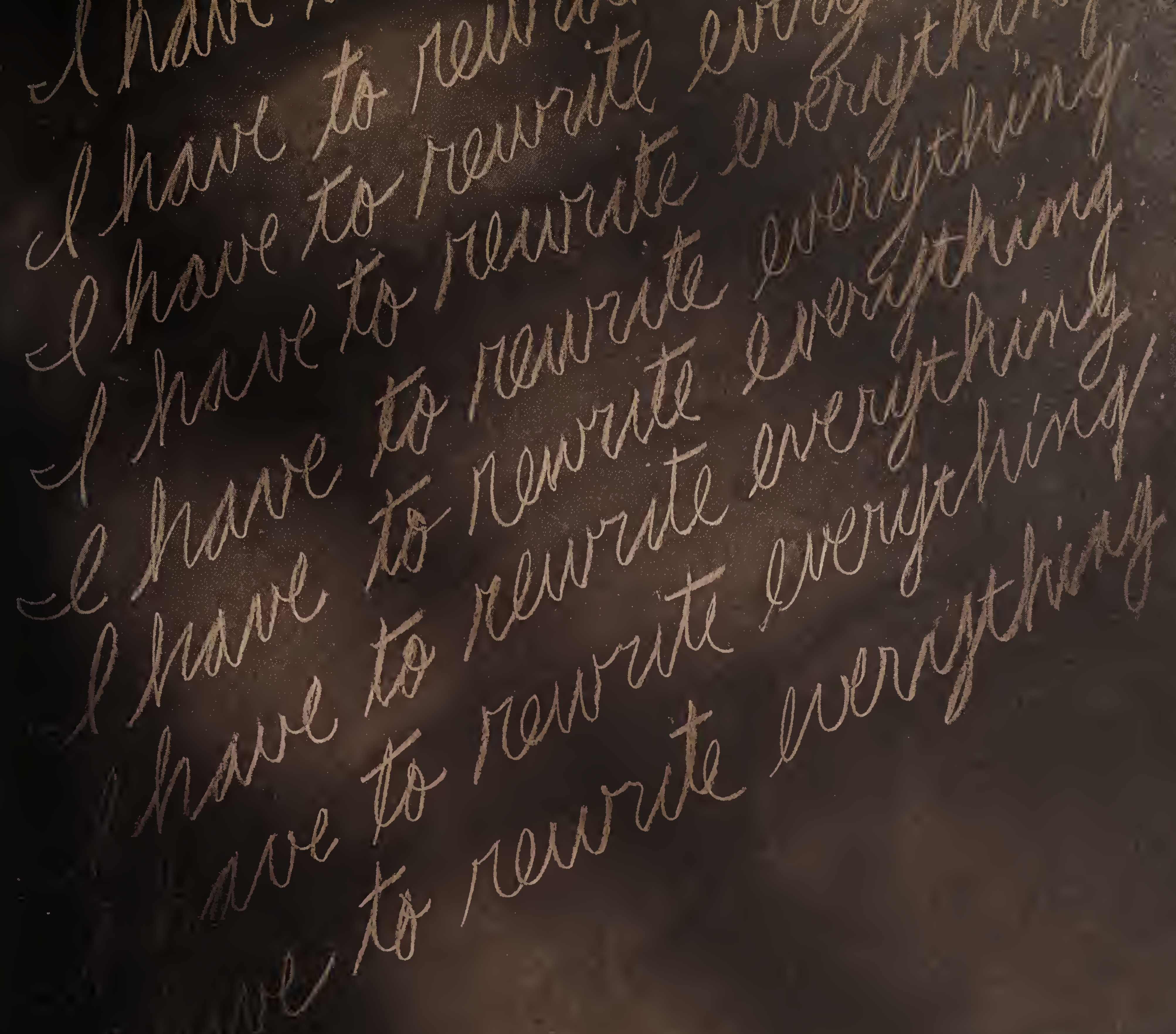
■ **"Technology shock"** is an occupational hazard for IS managers deluged by the latest and greatest high-tech tools. The solution: Don't ignore new technology, but be selective about it and carefully delegate some of the research and responsibility. **Page 54.**

■ **Users are increasingly taking** open systems matters into their own hands, spearheaded by the X/Open user consortium. Most members agree that major issues such as graphical user interfaces and connectivity to existing systems still must be resolved before open systems will present a viable alternative to currently installed proprietary systems. **Page 23.**

■ **IBM delivered used computers** to the federal government in contracts that specified new equipment, a Congressional panel ruled. IBM offered to a pay a $1.5 million settlement, but investigators refused any deal until the probe is completed. **Page 89.**

■ **On-site this week:** Boston-based financial services firm The Putnam Co. is taming the paper tiger as a pilot site for IBM's Imageplus imaging system. Imaging technology has completely replaced paper in the department that processes correspondence and account updates for Putnam's pension and mutual fund shareholders. **Page 25.** At Louis Vuitton's specialty shops, however, paper receipts are part of the personal touch that well-heeled customers expect. So in-store automation, in the form of IBM Personal System/2s, is carefully hidden behind the scenes. **Page 37.** At Mary Kay Cosmetics in Dallas, a pretty face is a common interface. Mary Kay is standardizing corporate systems on DEC platforms connected by Decnet, replacing a hodgepodge of Datapoint, Wang and other vendors' equipment. **Page 45.**

■ **Smart planners take command** and shape the computer industry's future instead of merely waiting for important things to happen. The key to this type of strategizing, dubbed "Future by Objectives," is to select the desired outcome and then figure out the needed events that will take you there. **Page 77.**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Hungry like the capitalist wolf

Lifting Eastern European barriers brings U.S. high-tech opportunities

BY AMIEL KORNEL
CW STAFF

In the best capitalist tradition, U.S. businesses aim to make a buck on the hard times befalling Communism. As some Western entrepreneurs ponder how to market rubble from the crumbling Berlin Wall, U.S. computer hardware vendors and software developers are hungrily eyeing new business opportunities in Eastern Europe.

While the bricks were falling, the political reforms rocking the Eastern Bloc in recent weeks set the stage for moves by those countries to mend their tattered economies. Their future technological foundations will require information systems to improve such fundamentals as manufacturing productivity, the distribution of goods and services and foreign trade.

"What the Soviets and East Europeans need most is distributed process control systems to drive industrial and agricultural processes," said William Chastka, vice-president at Washington Resources International in Washington, D.C.

"Computer items are very central to their policy of trying to increase imports in general," said John Slater, an economist at the United Nations' Economic Commission for Europe in Geneva. "There's a big pent-up dynamic that could cause a great increase in their imports of Western computer equipment."

U.S. computer companies believe that, sooner or later, this will translate into a business opportunity. "As all the countries who have been under that system look around the world and see where they're behind, they're going to see that one of the most important ways by which they can catch up will be to computerize," said Rod Canion, president and chief executive officer of Compaq Computer Corp.

The lifting of travel restrictions alone is sure to increase the installed base of personal computers, insiders said. "The first thing people will buy" when visiting the West, said Bruce Marquart, responsible for developing Ashton-Tate Corp.'s Eastern European business, "will be video equipment and PCs."

The 1988 installed base of professional PCs in the USSR was estimated at 80,000 to 120,000 by Heikki Auvinen, managing director of Asumer Oy, a Helsinki-based firm specializing in the Soviet market. The Soviet government's five-year plan, which runs through the end of 1990, calls for the installation of 1.1 million PCs, although this includes 8-bit machines destined for schools.

As the reforms gain momentum, U.S. computer firms already doing business in Eastern Europe have begun seeing double-digit growth in demand. Hewlett-Packard Co. released figures last week showing that its Eastern European business grew 58% in fiscal 1989 ended Oct. 31, to $67 million. "We see increased interest. The economy is opening up and developing. They are investing now," said Theresia-Maria Kucera, HP's East European marketing manager in Vienna.

Microsoft Corp., which currently makes $5 million in revenue in the East, plans to re-examine its business plan there. "All the rules have changed in the past month," said Ida Cole, manager of international marketing. "I think in our midyear business review in January, we're going to put a lot more focus in this particular area."

Swift growth in the number of joint ventures with Eastern European partners attests to the interest of U.S. firms from all sectors in the new market.

High hurdles

However, for U.S. firms hoping to cash in on the reforms, some hurdles must be overcome before business ventures become viable in Eastern Europe.

Paradoxically, one of the reasons some vendors hesitate to make any moves now is the state of revolutionary fever currently gripping Eastern Europe.

"Until we see this new freedom more or less integrated into their political system," Canion said, "I don't think you can be sure that it's not going to turn around and go back the other way."

"How do you operate a business in that environment?" asked Vivien Spathopulos, the Commerce Department official advising U.S. firms on business opportunities in Eastern Europe. "Excitement is one thing, and instability is another."

Businesses are looking to Washington, D.C., for help in increasing East-bound exports. "The U.S. will have to take a much more aggressive posture or risk losing any influence in Eastern Europe," Chastka said.

Foremost on the minds of U.S. businesses is the high-tech embargo list of the Multilateral Coordinating Committee on Export Controls (Cocom).

"Most PC hardware and software restrictions have to be lifted by Cocom and the State Department," Marquart said.

A relaxation of those rules also could be crucial to U.S. noncomputer companies' plans for closing deals in the East. "The business community is negotiating some substantial contracts, and very little doesn't include a computer," said John Hardt, associate director of research services for the U.S. Congress.

Another issue that currently stymies prospects for growth in East-West trade, U.S. businessmen said, is the difficulty of repatriating profits. The inconvertible currencies of Eastern Europe have forced companies doing business there to explore unusual payment mechanisms, including barter.

Bank questions fixes to IBM drives

BY ROSEMARY HAMILTON
CW STAFF

IBM claims the 3380 Model K disk-drive problem has long been resolved, but at least one user site shows that IBM may not be entirely correct.

The Royal Bank of Canada last week reported that it has been having problems with seven head-disk assembly (HDA) units since early October.

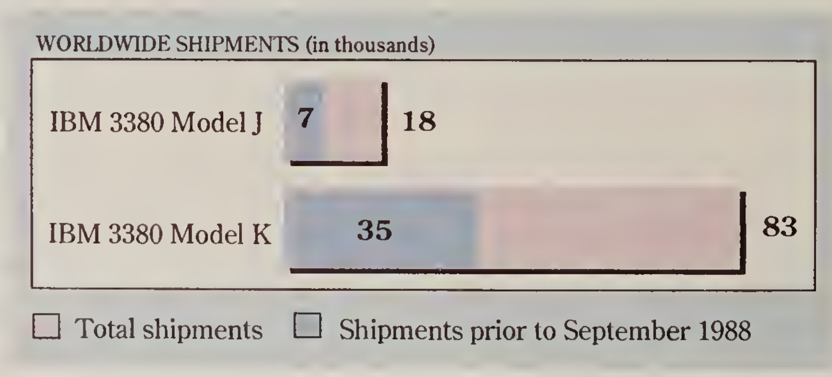
In August, IBM said it had identified the Model K's problem — a bearing in the HDA unit that was prone to vibrating too much — in 1988 and had been fixing it through various measures.

Earlier this month, Royal Bank returned six HDA units to IBM's San Jose, Calif., facility and is now waiting for an explanation on what went wrong, according to John Wood, the bank's director of computer operations.

According to Wood, a seventh HDA "took a hit" last week. He said this latest round of problems mirrors the Model K drive situation earlier this year. In both cases, early-warning microcode provided by IBM alerted the Royal Bank staff that problems could erupt on the disk drive. No actual failures have taken place, and Wood said that although the symptoms are the same, he is not sure if the cause is the same.

Broadening base

IBM's 3380J and 3380K have more than doubled their installed bases in the past year



SOURCE: INTERNATIONAL DATA CORP.

CW CHART: DOREEN DAHLE

He said what concerns him is that three of the seven units are replacement units IBM installed this year to correct earlier problems. The remaining four are HDA units built after fall 1988, when IBM began manufacturing all K drives with a new bearing.

An IBM spokesman said last week that the company is working with Royal Bank to address its concerns. He also said, "The 3380 bearing problem was fixed in fall 1988, and the new bearing meets specifications."

Apparently, the Model K drive problem is a hit-or-miss deal. Two other users contacted last week have not experienced any problems in recent months.

According to earlier statements from IBM, the bearing first used in the HDA unit of the Model K drives could in some cases vibrate too much and result in error messages. IBM first became aware of the problem in early 1988, and drives made after fall 1988 used a new bearing.

In addition, it offered several fixes to users with Model K drives already installed, including the replacement of entire HDA units and microcode that would alert them to potential bearing problems.

Last August, it began shipping a new bearing as an engineering change for Model K users.

At that time, Wood noted that there had been several problems with his Model K drives and that all HDA replacements were operating smoothly. But looking at his current situation he said, "Whatever it is, it means I have no viable replacement. If I find out it's the bearing again, I'm going to go crazy."

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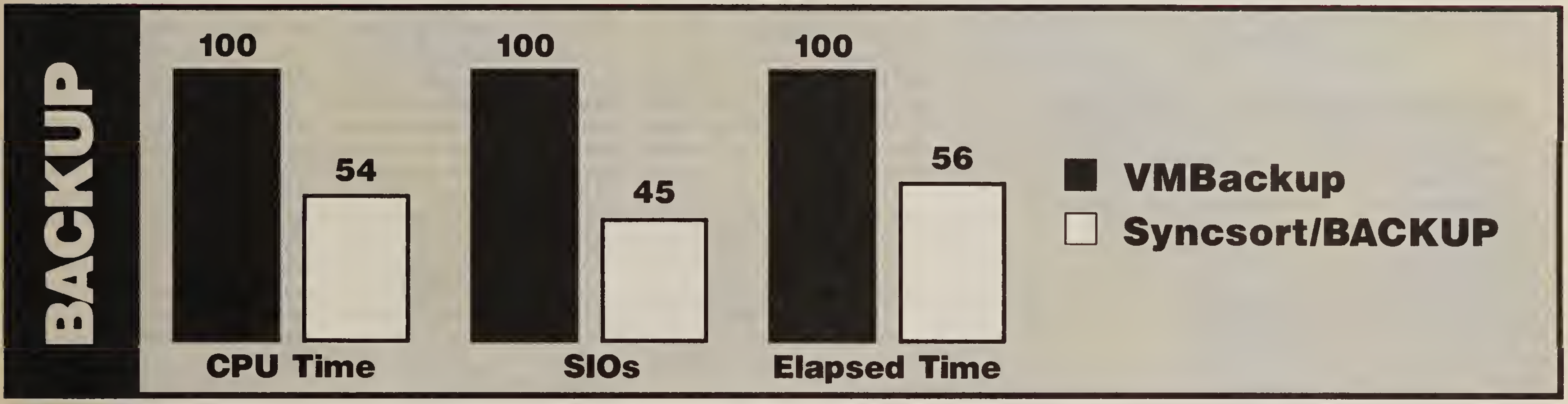

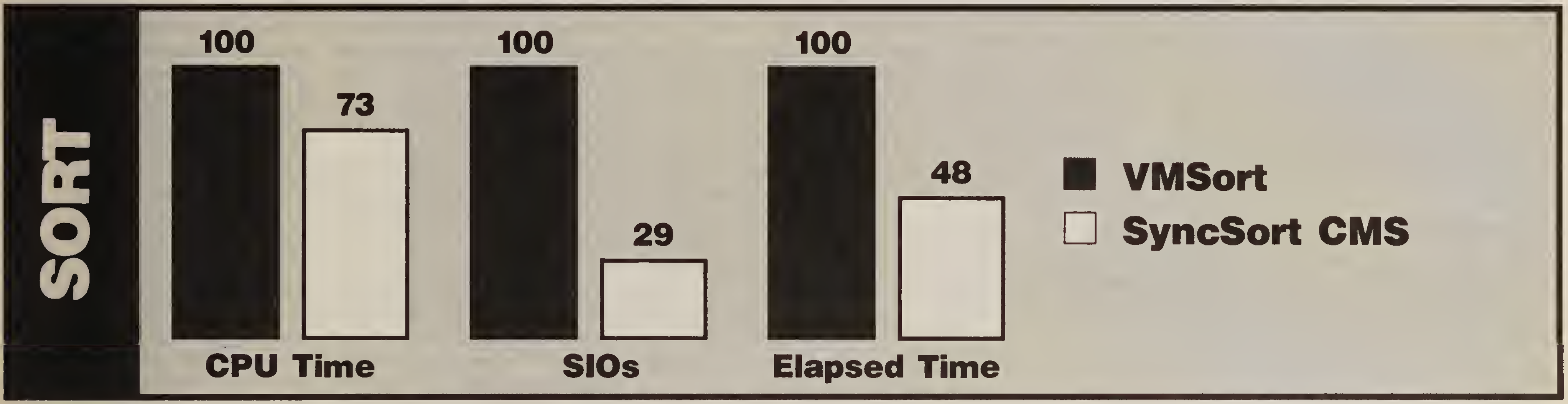

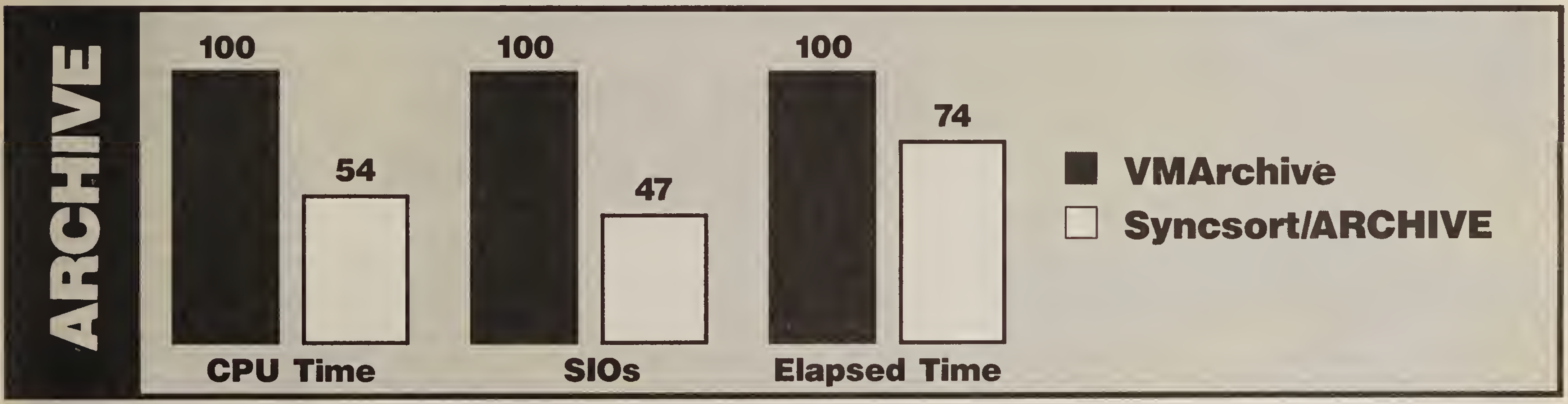

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NEWS SHORTS

REI acquitted in postal scandal

Recognition Equipment, Inc. (REI) in Dallas and two former executives were found innocent of charges that they participated in a conspiracy to obtain U.S. Postal Service contracts for scanning equipment. A federal judge ruled last week that prosecutors had insufficient evidence to link REI to a kickback scheme involving an REI consultant and Peter Voss, formerly on the Postal Service's board of governors.

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Bush moves to fill FCC, NIST posts

President Bush last week nominated Ervin S. Duggan to the Federal Communications Commission seat vacated by Democrat Patricia Diaz Dennis. Duggan, a Democrat who worked in the Johnson and Carter administrations, is a little-known Washington, D.C., consultant who reportedly was backed for the FCC job by the National Association of Evangelicals. Bush also nominated John W. Lyons to be director of the National Institute of Standards and Technology (NIST). Since 1983, he has been director of the National Engineering Laboratory at NIST.

……

DCA exits T1 arena

Digital Communications Associates, Inc. (DCA) said it will sell its T1 and multiplexer business to a subsidiary of Racal Electronics PLC for approximately $30 million. Under the agreement, the purchase price may be increased by not more than $20 million based on the network communications group's revenue over three years beginning April 1, 1990. DCA will concentrate on the remainder of its personal computer connectivity operations. This includes the 10net PC LAN business, Irma emulation products and Crosstalk software.

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Amdahl offers multiprocessor

Amdahl Corp. last week introduced a new entry point to the high end of its 5990 family of mainframes. The company said the 5990-790 is a multiprocessor running at 62 million instructions per second that can be partitioned into 14 CPU subsets. Prices start at $7.5 million.

……

IBM cuts VDT emissions

After sales in Europe, IBM is offering computer terminals in the U.S. that the company claims lower some electromagnetic radiation. The line, called Infowindows, blocks very low frequency magnetic fields by attaching a ring of magnetically permeable material to the yolk of the terminal. However, IBM and computer industry trade organizations reaffirmed last week their belief that VDT emissions do not present health risks.

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Micro-encyclopedia from Franklin

In 1935, Columbia University Press made publishing history when it announced the first one-volume encyclopedia in English. Now, holding that encyclopedia in your hands is going to take on a new meaning. Franklin Computer Systems, Inc. and Columbia University Press last week signed an agreement giving Franklin the worldwide rights to the "Concise Columbia Encyclopedia" for incorporation into handheld electronic form.

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AT&T, Sun announcement

AT&T and Sun Microsystems, Inc. last week announced new ways in which the two firms would work together. AT&T said it will use Sun's Scalable Procesor Architecture-based workstations in two applications involving AT&T's Pixel Machines business unit and its Network Systems organization. The firms will also work to identify system integration opportunities.

……

Congress extends R&D tax credit

Congress passed a budget reconciliation bill last week that includes an extension of the research and development tax credit — a favorite of the computer industry — that was set to expire on Dec. 31. But the R&D credit was extended for only nine months, so the industry will continue to lobby next year for a permanent credit.

CA generator takes on AD/Cycle

BY ROBERT MORAN
CW STAFF

GARDEN CITY, N.Y. — Computer Associates International, Inc. announced a code generator last week designed to speed up the applications development and maintenance process for CA-IDMS users on the mainframe and to signal the 3,000-strong installed base of former Cullinet Software, Inc. users that their new supplier will not abandon them.

Analysts said, however, that CA is also fighting the strong industry perception that IBM's AD/Cycle will be the principal provider of computer-aided software engineering tools and that IBM's DB2 database management system will be needed to use them.

"CA wants to say to users that you don't have to abandon IDMS because we will provide you with CASE tools," said Shaku Atre, president of Atre Computer Assistance, a subsidiary of Coopers & Lybrand in Rye, N.Y.

The software, called CA-ADS/Generator, fulfills Cullinet's promises to its users. It is geared for on-line entry and inquiry, according to CA, and will automate coding procedures, data validation and error handling — parts of the applications program-writing phase that consume numerous hours and expenses.

The software creates applications using forms, tables, code modules and expert systems that are defined in a set of nonprocedural high-level statements, called Program Specification Rules (PSR), that represent an application's programming requirements.

Further, the generator leverages Cullinet's highly reputable Enterprise code generator, which runs on Digital Equipment Corp. VAX computers. According to CA, the PSRs are independent of hardware, operating systems and databases; they can be ported across the mainframe, VAX computers under VMS and DOS-based personal computers. The software product is immediately available and costs between $36,000 and $96,000, depending on the size of the system and its configuration.

Staying ahead

According to Jeff Tash, president of Database Decisions, Inc., a consultancy in Newton, Mass., the new software is what Cross Systems Product, IBM's code generator, ought to be. "This places CA between 18 and 24 months ahead of CSP," Tash said.

He added that "PSR is much more mainstream and intuitive to developers" than IBM methodologies.

Beta-test site user Gary Stone, a database technical analyst at the Metropolitan Dade County Office of Computer Services and Information Systems in Miami, said that the software "lists some of the development components of the application and defines and creates a good first cut."

With the initial legwork completed, Stone said, applications developers are able to work at a higher level. He added that in comparing the number of lines of code that his organization generated vs. the lines of code employees actually coded, he saw between a 2-to-1 and 4-to-1 ratio, depending on the application. "The more you let the generator do for you, the higher the ratio you will get," he explained.

Another beta-test site user, John Luludis, systems development support manager at Volvo North America Corp. in Rockleigh, N.J., said that one of the company's biggest expenses is in writing and maintaining code, about 70% of which is written in ADS.

"We anticipate about a 40% improvement in the time that it takes to generate code," Luludis said.

In addition, both users said that they anticipate easier maintenance and debugging as well— a savings yielded from working at the program specification level. With less code to contend with, they will have to maintain fewer lines of code, they said.

While the VAX version produces C, Fortran and Cobol, the new mainframe version now produces ADS fourth-generation language code with embedded SQL. George Van Schaick, CA's vice-president of marketing, confirmed that the company will offer other languages on the mainframe — for example, Cobol — in 1990.

Air Force bombshell: Unisys gets micro pact

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Unisys Corp. surprised the experts recently and won a megacontract with the U.S. Air Force for up to 250,000 general-purpose microcomputers. Unisys essentially becomes the successor to Zenith Data Systems as the military's standard supplier of desktop systems.

The so-called Desktop III contract, awarded Nov. 17 by the Air Force Standard Systems Center (SSC) in Montgomery, Ala., is worth as much as $700 million if all options are exercised. The SSC reported that Unisys was the lowest price bidder.

The company bid its Personal Workstation 2 series of microcomputers, which use the Intel Corp. 80386 chip, said a Unisys spokeswoman in the firm's Blue Bell, Pa., headquarters.

The Unisys bid apparently bested proposals from the incumbent Zenith; Grid Systems Corp. (a unit of Tandy Corp.); Government Technology Services, Inc.; and Sysorex Information Systems, Inc.

> THE SO-CALLED Desktop III contract is worth as much as $700 million if all options are exercised.

James F. Kerrigan, a federal market analyst at Input in Vienna, Va., said the Unisys win was a surprise, in part because Unisys has not played a leading role in the federal personal computer market in the past.

Kerrigan also cautioned that the Desktop III contract award is very likely to be hit with an official protest, since that has become commonplace in major federal computer procurements.

The Unisys microcomputers will run both Unix and MS-DOS operating systems. The Unix operating system, supplied by The Santa Cruz Operation, will be compliant with the Posix standard for applications portability.

The initial two-year contract for approximately 75,000 microcomputers, software and support is worth $233 million. Air Force units are required to use this "indefinite quantity" contract for ordering desktop systems, while other military and civilian agencies have the option of ordering from the contract.

Initially, Unisys must deliver at least 3,500 units per month, increasing to 6,000 units per month beginning with the fifth month of the contract. The systems are manufactured at a Unisys plant in Flemington, N.J.

Andersen installs international ISDN video link

BY ELLIS BOOKER
CW STAFF

CHICAGO — The Integrated Services Digital Network (ISDN) will take two giant steps forward this week with the announcement of the world's first ISDN-based international video teleconferencing link over commercial facilities.

Illinois Bell, an Ameritech operating company, and AT&T Network Systems will provide the service to Andersen Consulting, which will use two Basic Rate Interface (BRI) Ameritech ISDN Centrex lines and AT&T's Switched Digital International (SDI) service to link its Tokyo office and its Chicago world headquarters.

Not only will this be the first international ISDN video link of its kind, it will be the first time a local telephone company and an interexchange carrier in the U.S. have collaborated to provide a commercial ISDN service.

Andersen previously was a BRI customer of Illinois Bell, which last March became the first local telephone company in the U.S. to announce a BRI ISDN tariff. A BRI ISDN line contains two 64K bit/sec. B channels for carrying digital data and one 16K bit/sec. D channel for packeted signaling data.

Andersen will evaluate the link for a month and hopes to illustrate the cost savings of using ISDN over traditional leased-line videoconferencing methods. Typically, full-motion videoconferencing must be delivered over dedicated 56K bit/sec. or T1 lines.

In the demonstration, the two B channels of one ISDN line will be combined into a single 112K bit/sec. video channel; voice traffic will be interleaved with the video signals. The result, according to Illinois Bell, is a "business-quality" picture which is better than compressed video but not television quality.

For some time, Bellcorp, the Livingston, N.J.-based research and development arm of the seven regional Bell holding companies, has heralded the use of ISDN as an inexpensive way to deliver video teleconferencing over ordinary phone lines. Andersen is using Picturetel Corp. coder/decoders — hardware that delivers video images over networks.

In addition to the video connection, Andersen will use a second BRI ISDN line for Group IV facsimile.

Because AT&T does not have a BRI ISDN service, the two ISDN Centrex lines have been rate-adapted to 56K bit/sec. — the speed of AT&T's SDI service. The two circuits will be carried from an AT&T 5ESS digital central-office switch in downtown Chicago over separate 56K bit/sec. facilities to Tokyo, where they will be carried by Kokusai Denshin Denwa Co. Ltd (KDD), the Japanese international carrier.

KDD, in turn, will pass them to Nippon Telegraph and Telephone Corp. (NTT), one of Japan's local phone companies, and then on to Andersen's Tokyo offices. A terminal adapter there will convert the circuits to the standard 64K bit/sec. ISDN rate.

Sources said the project may also represent the first time KDD and NTT have interconnected their networks for an ISDN service.

TI's chips sink in sea of losses

BY RICHARD PASTORE
CW STAFF

The National Advisory Committee on Semiconductors revealed its rescue plan for the U.S. semiconductor industry last week. But the news was too late to help chip maker Texas Instruments, Inc., which announced the same day that it will swallow a $55 million pretax charge against earnings and lay off 1,500 people.

TI tied much of its fourth-quarter troubles to tumbling prices of dynamic random-access memory (DRAM) chips. TI is just the latest U.S. DRAM vendor to falter in the face of low-cost foreign competition and slackening domestic demand for computer hardware.

The semiconductor committee has been studying the slumping sector since Congress established the group in 1988. Its plan calls on U.S. industry and all levels of government to foster availability of capital funding, revise trade and antitrust laws, boost support for the Sematech consortium, increase protection of intellectual property and improve the educational system.

The committee recommended formation of a business-backed, for-profit investment firm that would offer affordable capital to U.S. consumer electronics firms. A revitalized consumer electronics industry would in turn generate high-volume chip sales, the committee said.

David Garcia, a semiconductor analyst at Howard Weil Financial Corp. in New Orleans, has doubts about the strategy's chances in the long term. "I don't think attempts to emulate Japan's industry-government consortium can work in this country," he said. "Investors here aren't willing to wait as long as the Japanese for a return on investment. And at best, it will take years to see benefits" from these proposals.

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Calif. transit board dumps software vendor

BY J. A. SAVAGE
CW STAFF

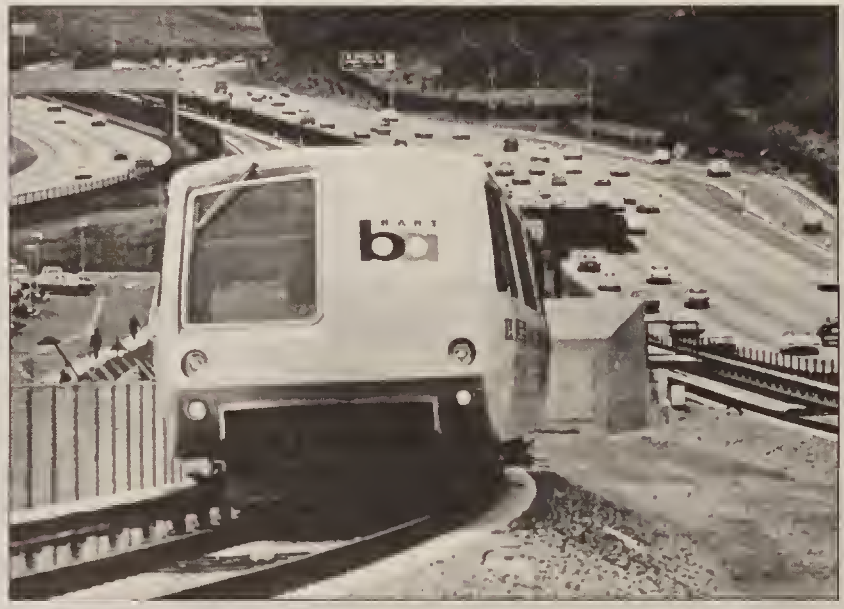
OAKLAND, Calif. — Overruling an auditor's recommendation, the Bay Area Rapid Transit (BART) system board last week declined to further its contract with Logica Data Architects, Inc. to finish a controversial software project.

The estimated cost to finish the over-schedule project for automated routing and tracking of BART trains [CW, Nov. 20] was $1.8 million beyond the $20 million already spent. A second audit discovered $2.67 million in excess costs already charged to the district and paid to Logica.

Bill Shrimpton, vice-president of Northern California operations at Logica, disputed the complaints lodged against the Waltham, Mass.-based company. Shrimpton concluded that "should we have inadvertently overcharged, we would return the money."

In a contentious meeting called to discuss the findings of BART's auditors — LS Transit Systems, Inc. and Peat Marwick Main & Co. — Logica was warned by board member John Glenn that its reputation in the U.S. is riding on the project to develop the Integrated Control System.

A recent test of the system, which carries an overall price tag of approximately $40 million, reportedly revealed that the current design will not support BART's growth plans.


Bay Area Rapid Transit *hits the brakes on software project*

Before the board declined to entertain a continuance of Logica's contract, it was told that the project has several flaws, but none of them were fatal, according to Bill Lipfert, project manager for LS Transit. Some of the flaws include the following:

- It does not meet capacity requirements.
- It cannot be transported to a larger computer.
- It has only a single communications path to BART engineers, and none to field stations.
- It takes three weeks to change the software to adjust to any physical plant changes.

Lipfert said that it is realistic to expect the new software to use 86% of CPU capacity with minor train upgrades planned for BART. The current CPU is a Data General Corp. MV/10000.

In-house BART project manager Jim Steiner disagreed with Lipfert about capacity. He said it was not a problem because the software prioritizes jobs, but he generally agreed with LS Transit's findings.

LS Transit estimated it would cost another $1.8 million to have Logica complete the project. LS Transit recommended that path because of the steep learning curve of hiring another contractor or a lengthened period for in-house engineers to finish the project.

No BART-ering

Although no actual vote was taken, BART board members essentially decided not to pay Logica any more than the $20 million already sunk, according to board member Sue Hone.

The board is considering completing the project with in-house engineers.

The board was stunned when Hal D'Ambrogia, auditor for Peat Marwick, said his company found a $2.673 million discrepancy between Logica's allowable costs and its billing. He claimed that BART was billed for overtime that was often not received by Logica employees and that administrative and overhead costs were less than rates proposed in the contract.

He added he could not conclude there was deliberate fraud but, "Logica hasn't been able to locate some records to complete our review." According to D'Ambrogia, Logica also kept two sets of books for hours worked on the job, one for billing to BART and the other for internal use.

BART's Steiner added that Logica had requested another $2.63 million in September, which was already paid out, but of which, upon review, Steiner believes less than 10% should be considered for payment.

Nello Bianco, a 20-year veteran of the BART board, estimated that the whole project was about $35 million over budget. At a total of $40 million, Logica accounts for about half of the entire cost.

Logica's Shrimpton charged that Peat Marwick's findings were based on an "invalid interpretation of the contract" and denied that his company overcharged BART.

Disagreeing with LS Transit, Shrimpton said that the software could be ported to a larger machine by rewriting only a small portion of the code for the application.

LS Transit said that it could be rewritten at a cost of "under $5 million."

LAN plans

FROM PAGE 1

processed on the mainframe and what can be processed out on location using a micro or LAN. I don't believe all this talk about going totally distributed or that the mainframe is a dinosaur of the past."

Home Equity, Inc. is performing a balancing act similar to New York's. The Wilton, Conn., insurance company has already implemented a homegrown screens-based system on which brokers can generate their own queries and reports on LAN servers, said Brad Calcagni, director of data communications at the firm.

"NOT TOO many people are using [SQL database servers] yet in a real industrial-strength type of application."

GARY SAVARESE
EASTMAN KODAK

Applications are now generated three times as fast as they were when everything resided on the mainframe, Calcagni added. "In three years, I guess we won't have any direct mainframe transactions left, except background maintenance like changing codes and files; day-to-day work will all be on PC-based applications."

However, Home Equity still needs its mainframes to provide a common view to a client who may do business with the insurance firm through several divisions, each served by a Home Equity regional office.

"The PC LAN database would hold data a given group would need but our clients want to look at everything, and we can't have them hopping from region to region," Calcagni added.

Covia Corp. "has been very successful so far" in moving applications down to LANs and having them coexist with "traditional monolithic mainframe dumb terminal systems," according to Mark Teflian, Covia's vice-president and chief information officer.

A LAN-based system provides the flexible applications development tools and modular architecture to serve the airline subsidiary's broad range of customers, including "large sophisticated and very small travel agencies, airline reservation offices and airports," he added.

However, large mainframes continue to be the "data servers" for airport operations; they are used for routing aircraft, baggage, flight and day-to-day operations to the right departments, Teflian said.

LAN servers need to make some major technical advances before they can take over the mainframe's role of data repository, sources said. Intel Corp. 80386- and 80486-based microprocessors may have the raw computing power to process large batches of data, but they lack the I/O capability for applications that involve "lots of disk access, lots of data moving around," said Norman Weizer, a senior consultant at Arthur D. Little, Inc.

This applies to both on-line transaction processing and batch applications, "where you get a whole slew of paper in every night," Weizer said. Airline reservation systems, payroll for large corporations and direct-deposit checking systems for large banks are likely to stay on the mainframe in the foreseeable future, he added.

"LANS ARE crucial to our cooperative processing strategy of moving data to where the people are."

MARK TEFLIAN
COVIA

IS managers' reservations about using LAN servers as data hubs go beyond the I/O port, however. Many are waiting for the new breed of SQL-based database servers to fulfill their promise of providing true, host-style data sharing.

"The whole area of SQL database servers is pretty new; from what I can figure out, not too many people are using them yet in a real industrial-strength type of application," said Gary Savarese, a project manager at Eastman Kodak Co. who has been involved in the organization's pilot testing of such servers on a 3Com Corp. LAN [CW, July 24].

Another major user concern is the "technical stability of the [LAN server] platform, when they have a mission-critical system which they need up 24 hours a day," said Theodore Klein, president of Boston Systems Group, Inc., a Boston-based consulting firm. The problem has two sides, in that many firms do not have sufficient staff to support decentralized LANs, and the LAN industry is far behind the mainframe culture when it comes to providing LAN management and diagnostic tools, Klein said.

Covia had to grow its own LAN management software in order to provide acceptable levels of reliability for a "mission-critical," 2,000-node 27-ring LAN at O'Hare Airport in Chicago, Teflian said. The firm developed applications for backup and recovery during distribution of data and software, as well as Heartbeat, a diagnostic package that "keeps up with trends of traffic, routing and general health of LANs," he added.

"LANs are crucial to our cooperative processing strategy of moving data to where the people are," Teflian said. "But the dark side of that story is that it takes a tremendous investment from us to ensure that those critical [LAN-based] operating applications work with the products that are available today."

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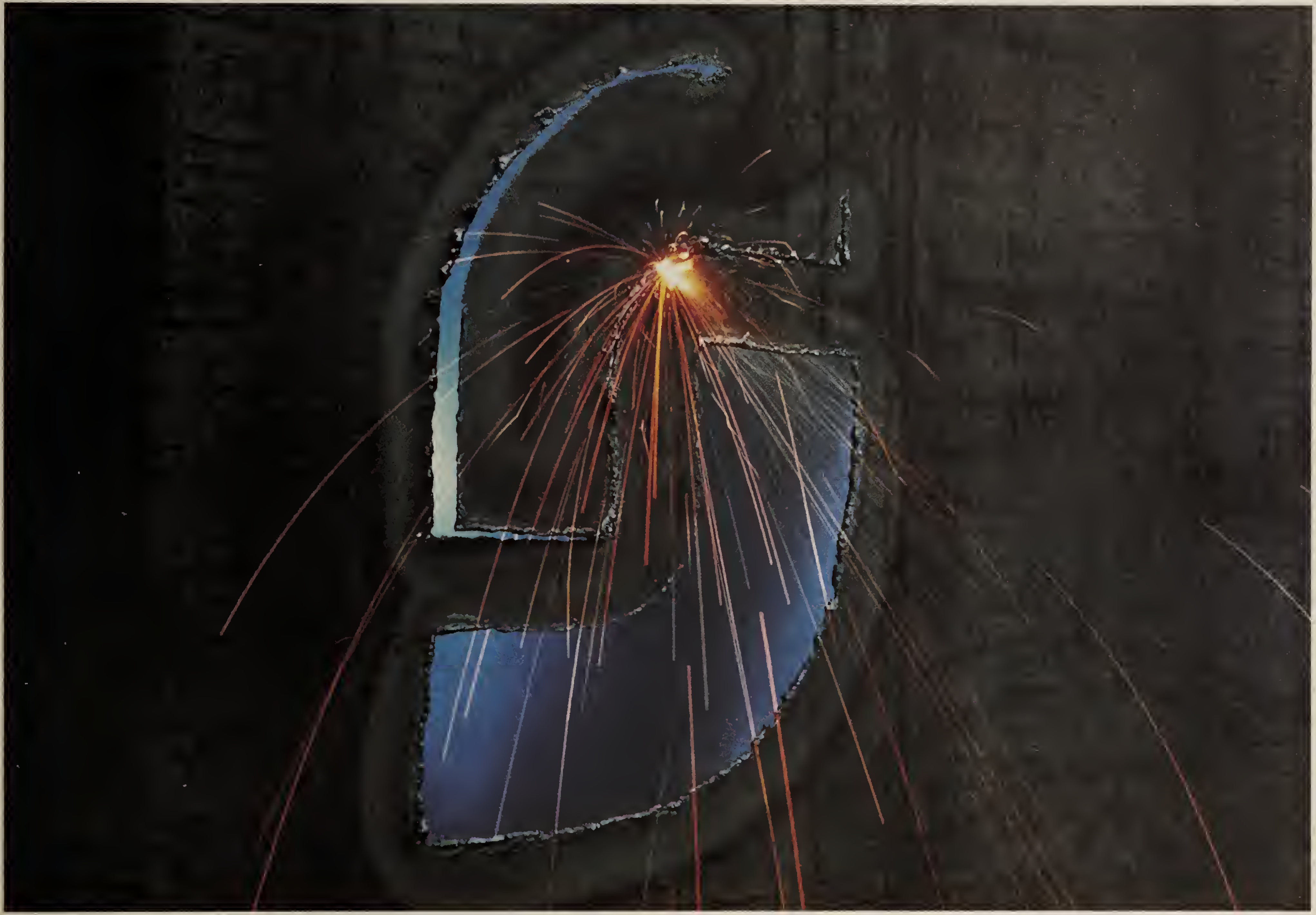

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OS/2 lite

FROM PAGE 1

factor in the system's slow sales.

However, in a series of interviews with *Computerworld* in the wake of the Nov. 13 announcement that stated Microsoft and IBM were "making a concerted effort to enable OS/2 for 2M-byte entry systems," executives could provide little evidence of a concrete foundation for the plan.

Instead, the executives portrayed a statement of direction rife with caveats and cautions. Neupert himself demonstrated little enthusiasm for the capabilities of OS/2 on a platform of less than 3M bytes, saying that anything below that minimum configuration would be severely limited in function.

"Even in the office automation market, there will always be tension around the entry point into OS/2, particularly with the cost of memory coming down," Neupert said.

"I will be happy with a point of entry at 4M bytes. You can't have application integration below 4M bytes. At 3M bytes, you can run a limited LAN client that won't be very fast. It won't run as a server," he added.

In addition, Microsoft executives for the first time conceded the existence of a now discarded plan for a "Presentation Manager Lite" interface to the ubiquitous MS-DOS operating system. Ballmer claimed his company had actively considered the prospect and had run the proposal by independent developers to see if there was support for it. He said it was just one of several proposals aimed at overcoming resistance to the memory requirements of Presentation Manager's interface.

"There was a lot of brainstorming to make OS/2 more competitive," Ballmer said. "One idea managed to leak out, but we categorically decided not to do that."

"There's lots of different ways that can be misconstrued," Neupert added. "PM on DOS was never real — fragmenting the [independent developer] community for another platform never made any sense."

IBM's announced plans to converge its own LAN Server with Microsoft's LAN Manager was another concession that splitting the OS/2 market was not making sense. "The LAN piece we screwed up," Neupert said. "Two similar products did not help when competing against Novell. We had to make them identical."

Start 'n go

Ballmer said the trade-offs and false starts that finally resulted in the announcement of an attempt at a 2M-byte version of OS/2 had been in discussion between IBM and Microsoft for about nine months but that the final decision to announce the 2M-byte direction "wasn't sewn up until a month" before the announcement.

"Comdex tends to drive decisions that are on the fence so that people can get on with life," Ballmer said. "We are continuing to collect more data."

The resulting downsized OS/2 effort and IBM's concurrent endorsement of Microsoft Windows for low-end personal computer was seen by many in the industry as a trade-off whereby Microsoft would limit future plans for Windows; Ballmer denied that interpretation, however.

"We haven't capped Windows in any way, shape or form," Ballmer said. Next year, he said, the company will roll out "the most significant Windows release ever."

Although the prospects for a downsized version of OS/2 struck a responsive chord in users, few were holding their breath waiting for a shipment date.

"I don't think there will ever be an OS/2 below 3M bytes," said Gary Frenkel, an analyst in the emerging technologies group at Martin Marietta Corp. in Lexington, Va.

"As the price of memory comes down, I will simply be looking for critical applications and a mature OS/2 on a 386 platform. My guess is that will come together in about a year. The announcement helps us by creating a more stable climate for applications developers," Frenkel commented.

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DG has plans to tie multivendor nets together

BY JOANIE M. WEXLER
CW STAFF

WESTBORO, Mass. — Data General Corp. set out last week to put remote multivendor networks on speaking terms with one another and tap what the company sees as a $300 million to $400 million market over the next two years for protocol, directory and document translation capabilities.

The company is aiming its standards-based Communications Server software at worldwide Fortune 1,000 corporations and network service providers. Initially running on the vendor's AOS/VS-based minicomputers, the product is slated to support DG's Unix-based Aviion computer strategy next year.

Once the software becomes available on Unix, DG intends to license the code openly to other makers of Unix-based products. "That will open up a whole lot of choice for end users," noted Steve Wendler, program director at Gartner Group, Inc. in Stamford, Conn.

Communications Server is designed to allow the exchange of messages among X.400, DG's Comprehensive Electronic Office office automation software, IBM's Distributed Office Support System, facsimile and telex users and have them received in the format used by the recipient. In addition, a C language customizer tool kit contains a library of routines that interface proprietary applications to the communications system.

The product was designed from the ground up as an open standards-based platform to allow for the development of value-added data services, said Herb Osher, director of DG's distributed computing group. Value-added services are often cited by industry analysts as a major distinguishing characteristic among vendors in the standards-based networking environment of the future.

Electronic switch

The software allows for the switching of electronic mail, directory services, document conversion, systems configuration and management and user/network accounting, which provides record-keeping and tracking but no built-in charge-back system. The product incorporates the X.400 message-handling and X.500 directory standards, which reside in Layer 7 — the Application Layer — of the Open Systems Interconnect reference model.

Wendler said the product will appeal to worldwide telecommunications users for reducing costs.

"You can put a Communications Server out on various parts of your network and send a mail message across your internal telecom network, which you're already paying for," Wendler explained. "Your telex or fax is carried on your internal network to, say, Japan, and then to get the telex or fax to the specific Japanese location, you pay for a local phone call — not for an expensive, intercountry long-distance call."

Voices carry

Wendler added that the product will appeal to telecommunications providers because "the voice business has gone flat, and they are looking for new revenue. [U.S. District Judge Harold Greene] has allowed the telecom carriers to provide messaging services, and they're all moving over to X.400," he said.

George Colony, president of Forrester Research, Inc. in Cambridge, Mass., acknowledged that the Communications Server product "has some real value" but expressed concern about DG's ability to attract customers for a complex product of this nature.

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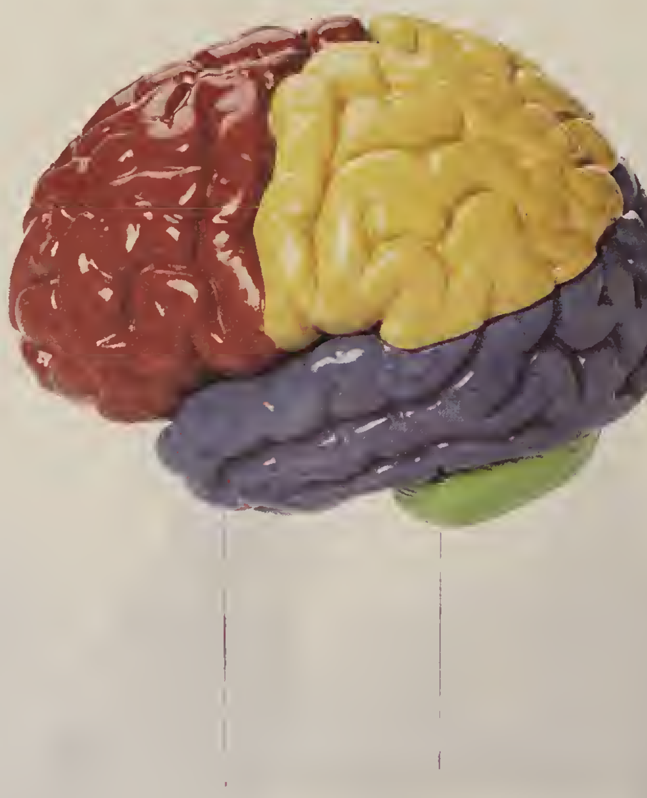

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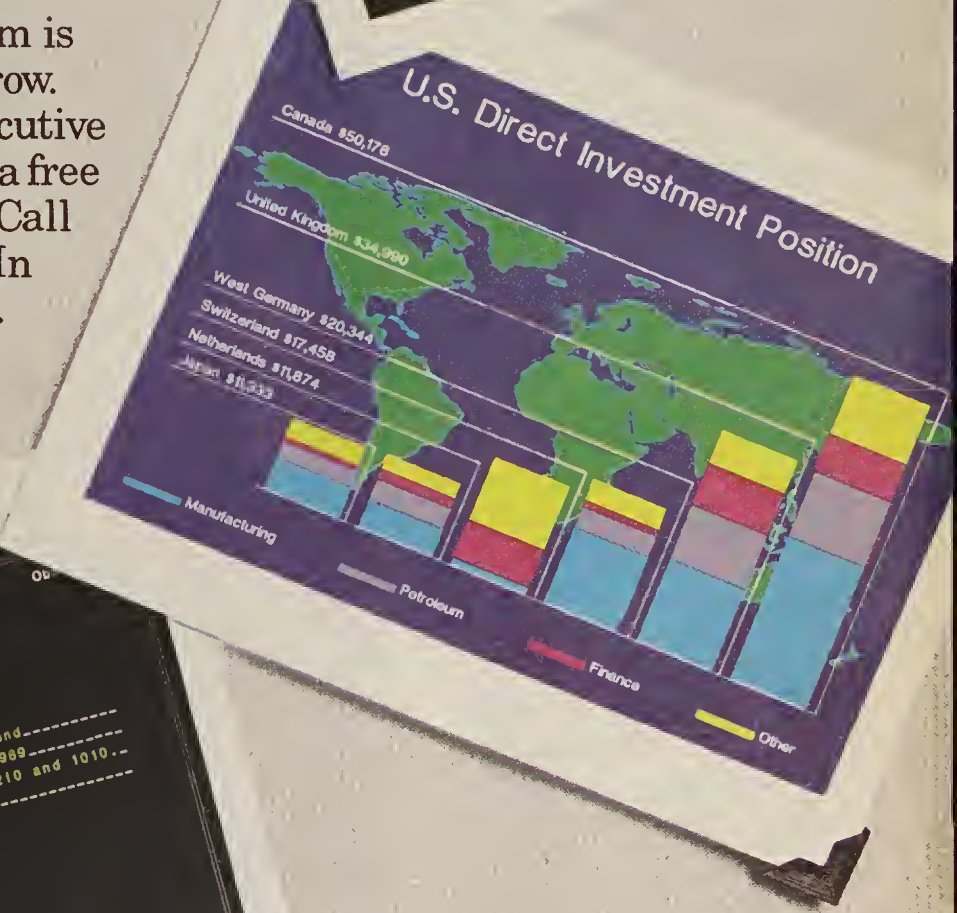
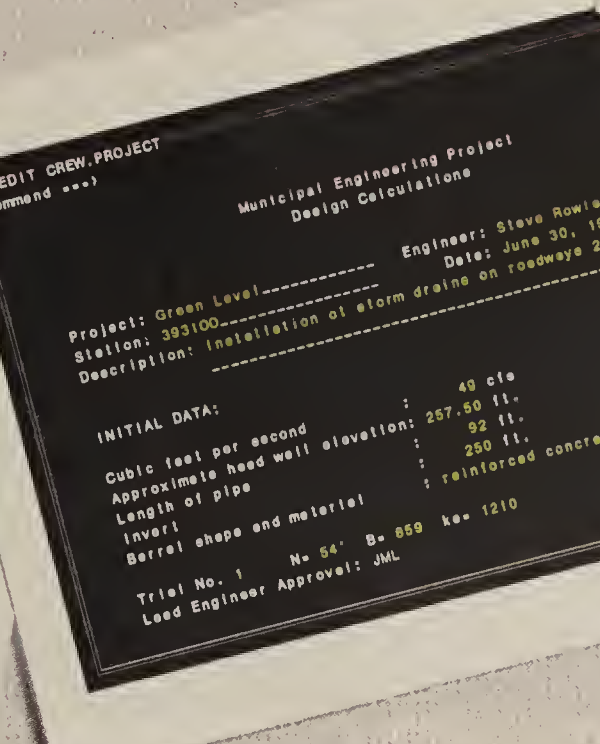


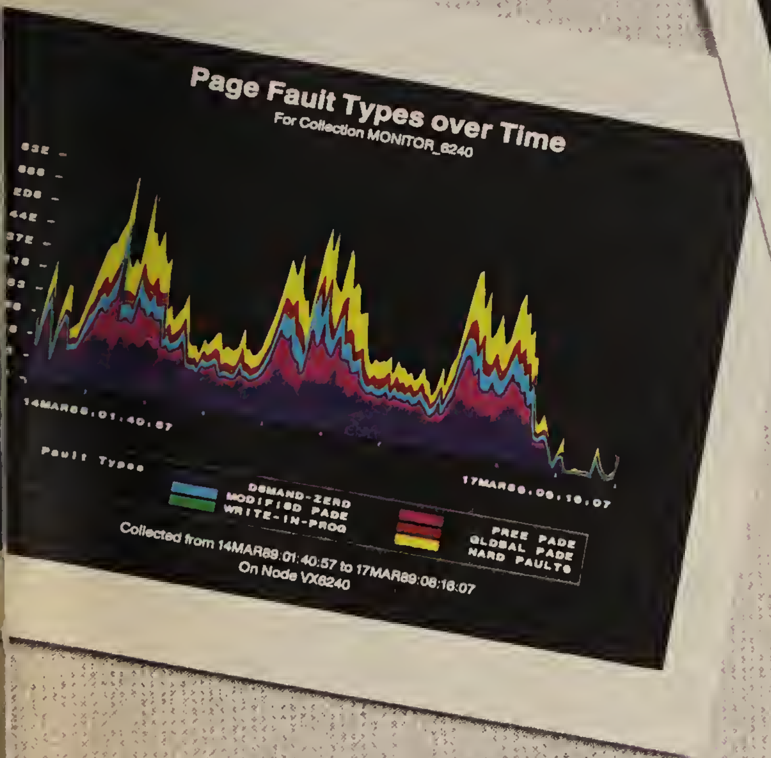


```
FSEDIT CREW.PROJECT
Command ===>
                    Municipal Engineering Project
                         Design Calculations

                                    Engineer: Steve Rowland__________
Project: Green Level_____________       Date: June 30, 1989__________
Station: 393100__________________
Description: Installation of storm drains on roadways 210 and 1010.__
             ________________________________________________________

INITIAL DATA:
                                    :       49 cfs
Cubic feet per second
Approximate head well elevation:   257.50 ft.
Length of pipe                      :       92 ft.
Invert                              :      250 ft.
Barrel shape and material           : reinforced concrete   Barrel n= 54'

Trial No. 1        N= 54'   B= 859   ks= 1210
Lead Engineer Approval: JML
```



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A chip off the old block. The new HP LaserJet IIP printer (front) with the best-selling powerhouse LaserJet Series II.

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The new HP LaserJet IIP printer.

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HEWLETT PACKARD

Time's not on Datapoint's side

BY PATRICIA KEEFE
CW STAFF

SAN ANTONIO — History repeated itself last week at Datapoint Corp., but time may finally be running out for the struggling firm that invented the Arcnet network technology.

After warding off a takeover bid, Datapoint announced yet another costly restructuring effort and launched its second campaign in less than a year to meet customer needs better by reorganizing sales and support.

At least one large Datapoint customer is skeptical and noted that the company needs new products, not just new sales approaches. Plagued with software and maintenance problems, the user suggested that Datapoint revitalize its network software; otherwise, it will not have many customers left to worry about.

Datapoint also appointed Martin Goldberg, formerly director of operations analysis, as vice-president and chief operating officer.

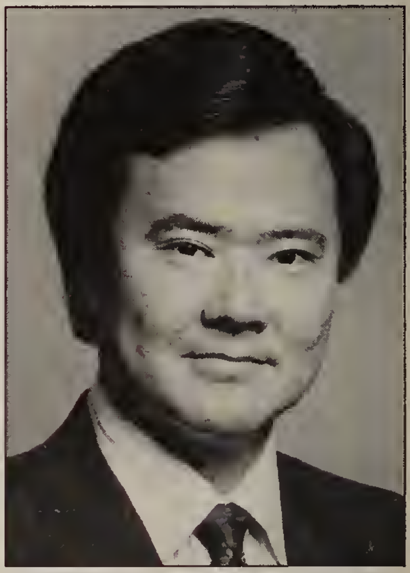
Three weeks ago, shareholder Martin S. Ackerman dropped his bid to take control of Datapoint's board and oust Chairman Asher B. Edelman.

Last week, company President Michael Michigami confirmed the layoff of 44 employees, primarily in the field sales offices, and declined to rule out further staff reductions.

"If things continue to get soft, we'll have to look at areas to bring down the cost structure," Michigami said.

Michigami positioned the restructuring of sales and marketing as key to Datapoint's continuing quest to respond better to customer needs.

After some prodding, Michigami said recent talks with customers revealed that many want gateways — which Datapoint does not provide today — to network standards such as Token-Ring and Ethernet. He said the company hopes to have these gateways ready when it ships Arcnetplus, a 20M bit/sec. version of Arcnet, in the first quarter of 1990.


Datapoint's Michigami

"Everyone wants [the gateways] to give us an easy migration path away from Datapoint without having to toss everything away and start all over," a customer said.

Michigami also promised to "undertake an accelerated program to get costs in line with what we think our U.S. revenue stream will be." He said he has been eliminating operations "where we historically have not had much success." He predicted increased revenue despite "a fairly slim cost base."

Three sales offices have been closed so far; others will be relocated or downsized. Overall, there are 16 sales offices nationwide.

Michigami said he expects downsizing of the sales effort to result in a $2.3 million charge against fiscal 1990 first-quarter earnings, which were to be released last week.

Similarly, restructuring charges in fiscal 1989 were blamed in large part for a net loss of $239.2 million on revenue of $312.5 million for fiscal 1989 [CW, Oct. 2].

In addition, four strategic business units were formed to focus better on key market segments: major end-user accounts, value-added resellers, the public sector and video teleconferencing.

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Electro-optic sensors will track targets even in highly cluttered environments. The Dual Mode Tracker, developed and being readied for production by Hughes Aircraft Company, has the capability to track missiles, aircraft and vehicles. Using an advanced correlation/centroid tracker, the system can simultaneously track targets while automatically selecting the preferred mode of tracking. It will also automatically acquire moving targets in the field of view of any video imaging sensor connected to it. The Dual Mode Tracker can be utilized in tactical and strategic applications.

A new processor that may one day outperform today's supercomputers uses incoherent light and a unique arrangement of electro-optical modulators. Called PRIMO (programmable, realtime, incoherent, matrix, optical), the processor, being developed by Hughes, passes light signals through successive grid layers, forming a two-dimensional matrix that can modulate the signal. The entire gridwork is addressed with electrical signals fed only to the edges. Thus, the processor can perform complex mathematical functions in parallel, manipulating data at extremely high speeds. The compact device is rugged, requiring no lenses or precise alignments, and is small enough to hold in one hand.

Microwave transmissions of more than 80 television channels over extended distances have been made possible by a new solid state broadband transmitter, developed by Hughes, with the highest power output in its frequency range of 13 Gigahertz. The indoor transmitter, designated the Model IBBT-116, uses the latest power doubling and feed forward gallium arsenide technology to achieve a 6-fold increase in output performance. Besides increasing the distance over which signals can be transmitted, the new equipment permits more receiving points than similar transmitters. In addition to cable TV and other kinds of microwave signals, the new technology can be used in satellite and ground terminal applications.

New computer-controlled milling machines automatically correct for tool wear and other machine misadjustments. By operating up to 10 times faster than conventional equipment, these new Hughes machines make continuous off-line inspection of machined parts prohibitively expensive. So before and after each tool is used, an internal contact probe measurement system checks the dimensions of a trial cut. If the cut does not meet specifications, computer software in the controller adjusts the tool to bring it back into tolerance. These machines are used to manufacture radar system parts whose thousands of dimensions must be held to tolerances of three thousandths to .5 thousandths of an inch.

Hughes' Combat Systems Engineering Facility in San Diego, California has immediate openings in advanced development and training to support the Navy Command and Control Processor (C2P) and Advanced Combat Direction System (ACDS) Programs. Experience desired for Combat Systems Engineers includes 7-9 years of system level development of military systems, preferably Surface Navy Combat Systems. For Computer Programmers/Instructors the level of experience desired is 4-5 years of designing, coding and debugging computer software. Teaching or training experience is desired. Applicants must have a B.S. Degree in Computer Science or the equivalent. Please send your resume to Hughes Aircraft Company, Ground Systems Group, Dept. S3, P.O. Box 4275, Fullerton, CA 92634. Equal opportunity employer. U.S. citizenship required.

For more information write to: P.O. Box 45068, Los Angeles, CA 90045-0068

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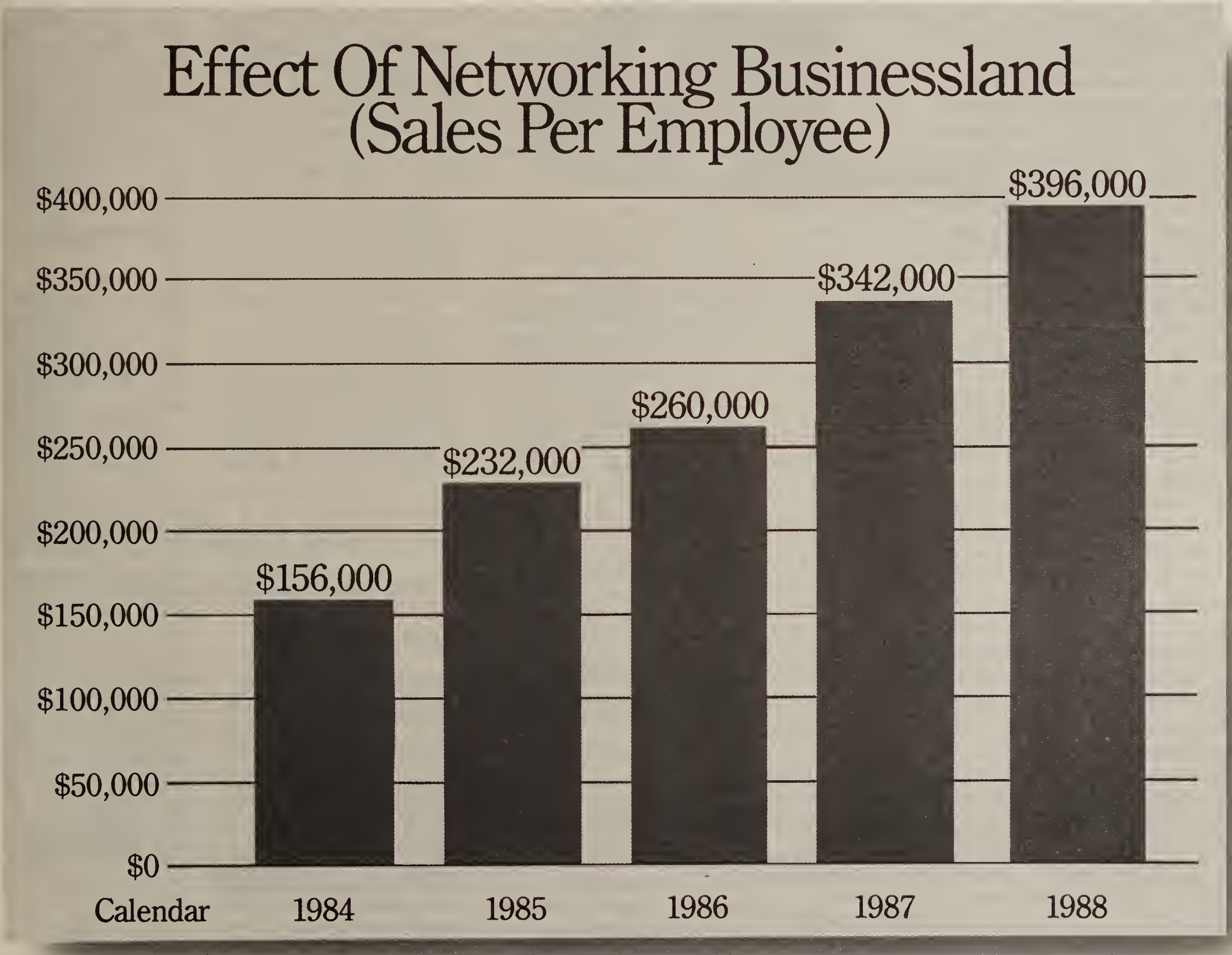

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EDITORIAL

Give and take

THE SEASON FOR giving will fast be upon us, but the Bush administration may well have other sentiments in mind as it contemplates how it can do a better job of keeping its spending more in line with its income.

For some time now, the primary target of the president's budget ax has been the Department of Defense budget, which grew so disproportionately during the Reagan years. Initial efforts did not garner much savings, because every time the president and defense secretary omitted an obsolete or useless weapon from the DOD budget, some congressman would stick it back in to protect local constituencies.

Now there are reports that the president will aim at a different flank of the DOD juggernaut: the prodigious spending on research and development that has been so beneficial over the years to both the military and the private sector.

That the reports of the intended cuts are so plentiful has led some to believe that the administration is floating a balloon before officially committing to the budget-reduction effort.

As would be expected, criticism has been sharp. Because the White House will say nothing official yet, everyone associated with literally hundreds of DOD-related research projects is crying foul, invoking everything from the global competitive imperative to the Bill of Rights in demanding that cuts not be made.

In fact, it is tempting to jump on that same bandwagon. Private industry and the U.S. economy in general have benefited tremendously from government-sponsored research. The ballpoint pen was developed in the 1930s for use by U.S. Air Force pilots flying at high altitudes (fountain pens just didn't cut it) and, well, we know what happened after that. Certainly the list of other benefits is extensive.

It is, however, fair to ask at this point just how efficiently the research money has been spent, notwithstanding the broad benefits that have been derived. An exact answer may be difficult to come by, but most people would agree that the private sector has historically allocated resources for R&D, among other things, more efficiently than the federal government has.

One reason for this economic fact of life is that the congressmen who saved the defense programs that even the DOD did not want are the same people who influence and even direct the expenditure of federal R&D funds.

Maybe it is time to begin thinking about doing things differently. The federal government has several ways of fostering high-tech research in the private sector without actually paying for it directly. For example, a recent report claimed that the administration is mulling a multibillion-dollar venture capital operation to help resuscitate the nation's consumer electronics industry.

No doubt, other interesting plans will be aired in the coming months. The most prudent of them will be those that help wean business R&D away from that big earth mother known as the federal government.

MAYBE WE SHOULD JUST POSTPONE THE RECEPTION.
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LETTERS TO THE EDITOR

Fair or not?

In "Call it unfair at the job fair" [CW, Oct. 23] Michael B. Cohn entertained us with an amusing story of the recruiting frustrations of today's hiring manager. Poor Mr. Cohn. Well, there is a flip side to this coin, and it is one that I am eminently qualified to tell.

In August 1988, I was laid off. I polished my resume, prominently displaying what I thought were highly marketable aspects of my background — an M.S. in computer science from a well-known major university and over 10 years of programming experience.

After visiting dozens of booths at several job fairs, I got only a few interviews and no job offers. My problem, simply put, was that my experience was with unpopular languages and hardware. I was considered a "retread," a derogatory term used to label a programmer with obselete skills that nobody wants.

Finally, after 10 months of unemployment, I received a job offer, but not through a job fair or even through a headhunter. I got it by mailing an application to a company that was hiring at the time. It was a minor miracle. I took a 20% pay cut, however.

With the current glut of programmers, my guess is that poor Mr. Cohn's company cannot attract candidates because the pay is too low, the computer hardware is too obsolete or the company has a negative reputation. So, take heart, Mr. Cohn; it's not all your fault.

Really good programmers are talented people that deserve good pay and real respect, not false promises and pigeonholes.

Norby Dooley
Candor, N.Y.

Gap gaffe

In "3Com announces stopgap network measures" [CW, Nov. 6], I was quoted as saying "For most heterogeneous campus LANs, the solutions are the worst possible mess that you can imagine." I would like to make it clear I wasn't talking about 3Com's new products, but the appearance of that statement immediatley after an announcement of 3Com network management APIs must have confused lots of people. It certainly confused 3Com (sorry, folks).

For the record, my comment was meant to indicate the vast distance between the functionality of most network management products available today and the needs of typical users. It did not refer to 3Com products. In fact, I was impressed with 3Com's new products.

Steve Spanier
Vice-President
Infonetics, Inc.
Santa Clara, Calif.

Update the CASE

"Banking on a CASE project" [CW, Oct. 30] includes some outdated information about our Information Engineering Workbench family of CASE tools. It is true that early in 1988 our Gamma application generator was not yet integrated with our front-end CASE tools.

However, in September 1988, our company shipped IEW/GAMMA, which is completely integrated with our PC-based tools for planning, analysis and design through a common encyclopedia now shared by all of our tools.

Currently, Knowledgeware customers can choose from three integrated application generators: the mainframe-based IEW/GAMMA, our PC-based Construction Workstation and IBM's Cross System Product, available from Knowledgeware through our relationship as an IBM Business Partner.

Donald P. Addington
Executive Vice-President
Knowledgeware
Atlanta

Not so open

My response to Douglas Barney's "Not an open and shut case" [CW, Oct. 23]: Well said.

It is a great shock for me to discover that not all of the computer press has fallen for this nonsense about proprietary systems being passe in our new, open world.

What still amazes me is how Apple Computer, Inc., the ultimate in closed systems, is widely portrayed as the leader of the new wave, friend of the masses and so forth. A real triumph for public relations.

The open systems hysteria (your phrase and very correct in my opinion) is largely the product of the press, the Unix fanatics, the OSI politicians and the long-haired types who inhabit the academic world. In the commercial world where people do real work to earn money for their employers, I never yet have heard anyone sitting around demanding open systems.

Philip H. Dorn
New York

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

Beware the outsourcing horse

JOHN L. KIRKLEY

Imagine for a moment that on one bright and glorious morning last summer, you came to work at Eastman Kodak in Rochester, N.Y., and in the parking lot, there was a huge wooden horse with IBM stenciled on its side.

You dashed into the data center shouting, "Get rid of that thing, it's a trick!" but nobody listened to you.

When you looked out the window, you saw that a door had opened in the horse's side and men clad in blue suits and white shirts were spilling out. They began running in your direction, clipboards ready.

The scenario is, of course, nothing but fiction . . . a little information systems nightmare that might come over someone during that period between sleep and waking.

The reality is much more straightforward. Last July, Kodak announced that IBM would consolidate and manage all of its U.S. data center operations over the next decade. Kodak, in essence, awarded a super facilities management contract to Big Blue in what this newspaper termed "a dramatic example of the current trend toward outsourcing information systems operations . . ."

IBM will construct a new data center to consolidate Kodak's existing four centers and has hired several hundred Kodak IS operations employees to help run the shop.

Now, some months later, the dust has settled, and we've had a chance to talk to some IS managers at other Fortune 500 companies. Reactions are mixed.

The major concern mentioned by managers, and carefully considered by Kodak, was the use of mixed vendor technology. Kodak has set up two committees — a strategy committee and a technology committee — with representatives from both IBM and Kodak, as well as outside consultants, to ensure that decisions are made in Kodak's best interests, not IBM's.

Commenting on the contract award, one IS manager said wryly, "It looks like Kodak's MIS management admitted they couldn't handle the situation. So they turned to IBM." At his company, this particular manager remembered a time when it had constructed a homegrown telecommunications package. IBM told it that it could save money and operate more efficiently by installing IMS. "We now have 35 people just to service IMS," he said.

"This is a classic management problem," another IS manager told me. "Forget Peter Drucker, let's go back to someone who really knew what was up . . . Niccolo Machiavelli. Just what would he tell Kodak?"

Based on Machiavelli's comments in *The Prince,* the 16th century Italian would advise his 20th century counterparts to use extreme caution.

When it comes to waging war — the chief occupation of Italian princes in the 1500s — or managing a huge data center operation in the late 1980s, the prince can look for help among his own subjects, hire mercenaries or contract with auxiliaries.

"Mercenaries and auxiliaries are at once useless and dangerous, and he who holds his State by means of mercenary troops can never be solidly or securely seated. . . . Whenever they are attacked, defeat follows; so that in peace you are plundered by them, in war by your enemies," writes Machiavelli dourly.

CHRISTOPHER BING

Machiavelli has little use for auxiliaries, "by whom I mean, troops brought to help and protect you by a potentate whom you summon to your aid. . . . Auxiliaries may be excellent and useful soldiers for themselves, but are always hurtful to him who calls them in; for if they are defeated, he is undone, if victorious, he becomes their prisoner."

However, one can argue that this is not 16th century Florence. As the top information officer of a large financial services firm told me, "Any CIO who is not investigating outsourcing his information processing functions is not doing his job."

Because of technology, he said, we have moved away from the days of hierarchical management typified by the old General Motors (and 16th century Italy). In the past, vertical integration made sense. Management could reap the benefits of economies of scale and maintain tight control by doing everything in-house.

These days, the IS director commented, economies of scale within the information processing function can be realized in a different way. It's a reflection of the new networked organizational structure within corporations: Management reporting relationships are becoming flatter, less hierarchical.

"We've had time-sharing for years," he said, "but now, because of advances in telecommunications, we can be truly indifferent as to where the processing function is taking place." We trust utilities to supply us with power and telephone companies to provide communications, he noted. To him, it makes the same kind of sense to turn the processing function over to a facilities management firm such as EDS . . . or IBM's National Service Division.

But never, never applications development. That must be kept in-house. "Applications programmers and analysts will be inside the companies, but no longer in IS," he said. "They'll be in the marketing, distribution, finance, manufacturing and human resource departments."

"If the heart and soul of the particular business is not tied to information systems processing, then there is a powerful argument to farm it out," he continued. "Kodak, after all, is in the business of providing photographic systems and supplies. Financial services companies, however, live or die by their IS functions, so they have to be careful."

Or, as Machiavelli pointed out, "A wise Prince should build on what is his own and not on what rests with others."

Kirkley is a computer industry writer, editor and consultant based in Warwick, N.Y.

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MICHAEL COHN

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1) A. You write good specs and requirements.

B. You'd write good specs and requirements, if you had to do it all over again.

C. You'll write good specs and requirements, since you have to do it all over again.

2) A. You challenge your really good people.

B. You know who your really good people are.

C. You know where your really good people went.

3) A. You expect the unexpected.

B. You survive the unexpected.

C. You cause the unexpected.

4) A. You usually run out of buffer at the end of a project.

B. You usually run out of Bufferin at the end of the project.

C. You've never seen the end of a project.

5) A. The night a system goes live, you hope no one will find any problems.

B. The night a system goes live, you know no one will find any problems.

C. The night a system goes live, you know no one will find any programmers.

6) A. When the going gets tough, you keep your head.

B. When the going gets tough, you save your head.

C. When the going gets tough, you call your headhunter.

7) A. You still stand out as technically current.

B. You still stand out as technically current because you're surrounded by technically current people.

C. You still stand out as technically current because you're surrounded by hopeless idiots.

8) A. People do as you say.

B. People do as you say, not as you do.

C. People say they don't know what you do.

9) A. Users call you because you know a lot of things.

B. Users call you to fix a lot of things.

C. Users call you a lot of things.

10) A. You love to wake up and go to work.

B. You hate to wake up and go to work.

C. You hate to wake up while you're at work.

11) A. You can see the forest through the trees.

B. You can see the forest through the trees, until you're flattened by some executive who goes out on a limb.

C. You're smart enough to keep out of the woods in the first place.

12) A. When the going gets tough, you plan.

B. When the going gets tough, you get going.

C. When the going gets tough, you leave early to beat the traffic.

Cohn is a quality assurance representative based in Atlanta.

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HARD TALK

Rosemary Hamilton

Healthy skepticism

IBM's disk-drive history has had its share of dark hours. Given that, one would have expected more skepticism from users when IBM announced earlier this month that its technical problem with the 3390 was completely behind it.

But what we saw instead was an outpouring of support for IBM. Users said that if IBM said the problem was solved, then they had to believe it was.

I don't want to suggest that this loyalty is misplaced, but certainly some more caution is called for here.

IBM's story of what went wrong with the 3390 was believable. People close to IBM have said they buy it, and they are sure the problem is fixed. But the IBM story left a few shreds of doubt that shouldn't be overlooked.

Let's take a walk through the story provided by Paul Low, president of IBM's General Products Division. Think about this lubricant again, the one used on the 3390 disk that set off a chain of events that would have eventually caused a loss of data.

Continued on page 29

Users flash directional signals

X/Open report highlights requirements for open systems

ANALYSIS

BY AMY CORTESE
CW STAFF

Users are taking the reins in steering the outcome of open systems.

This trend was highlighted at a private conference sponsored by X/Open Ltd., the standards-specifying consortium, last June in Montreal. More than 100 senior managers from corporations worldwide gathered to discuss their requirements for open systems.

Now, their comments on those requirements have been incorporated into an overview published by X/Open. It is clear from what they said that there are many issues — such as graphical user interfaces and connectivity to existing systems — that still must be resolved before open systems will present a viable alternative to currently installed proprietary systems.

However, what is also clear from recent conversations with participants is that their companies are serious enough about open systems to start taking an active role in shaping its future.

"Typically, these kinds of things have always been dominated by industry," said Larry Sikon, chief technical officer at DHL Systems, Inc. "But users will ultimately make or break it."

Sikon said the X/Open conference and market research program gives users a long-overdue voice: "It holds out the promise of letting the user community have greater say in what gets built and what happens in the future."

Bill Keatley, director of technology at American Airlines, paraphrased his Chief Executive Officer Max Hopper's predictions that said users will be specifying to vendors what they want rather than taking what they are given. "There has been a strong movement to having the world Unix community get together," Keatley said.

It is time for companies on the "consuming side" of technology to become more active, added Danny Wigley, a senior systems consultant at Du Pont Co.'s fiber department.

The X/Open conference was part of a broader program to solicit input from the user community. As part of an initiative

Continued on page 28

Inside

- DEC's Glorioso manages people by believing in them. Page 25.
- Putnam's paper environment slims way down. Page 25.

New tool designed to spruce up old Cobol

BY ROBERT MORAN
CW STAFF

LOS GATOS, Calif. — XA Systems Corp. recently announced a software re-engineering tool designed to do much of the dirty work that is involved in making old Cobol programs new and more useful.

The software, called Datatec-DS, is used to convert undocumented and inconsistent Cobol data definitions into standard data elements and record definitions. That is a prerequisite to converting, migrating or redesigning systems and also for bottom-up modeling and data dictionary and repository population, according to the organization.

Ed Acly, program manager of the software technology group at International Data Corp., a market research organization based in Framingham, Mass., said that Cobol systems are in various states of decay throughout many organizations, with a duplication across systems of Cobol data names. Those systems, he said, must be cleaned up before re-engineering can begin, and the process cannot be performed manually.

"The world tells us that 70% of their resources are being consumed by maintenance, and that anything we can do to help the maintenance programmer means potential savings," said Vaughn Merlyn, chairman of Case Research Corp., a consulting firm in Bellevue, Wash. "The marketplace tells us it is their biggest need, but products that address the need don't sell very well."

Tooling around

A similar tool is offered by Adpac Corp., the San Francisco-based developer of PM/SS. However, part of the problem, Merlyn said, is that the products available do not come from a vendor that offers a set of tools to clean up the data, reverse-engineer it, forward-engineer it and test and maintain it.

In contrast, XA Systems offers tools in all categories and has acquired Datatec-DS from KPMG Peat Marwick's Catalyst group.

Beta-test user Elaine Ramirez, an associate systems analyst at Pacific Bell in San Ramon, Calif., said that the company has been evaluating Datatec-DS for standardizing data names within programs with the goal of being able to begin a repository or a data dictionary.

"We are starting to get more involved with CASE as well," Ramirez said. "I would think one of the steps would be to try and clean up information in order to try to reverse-engineer it into CASE tools."

Datatec-DS costs \$100,000, is available immediately and operates under IBM's MVS, MVS/XA and MVS/ESA operating systems, the firm said.

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A Comparison Chart of the Major Cooperative Processing Software Products:

Functions:	SUPER-LINK® Family	Easel™	Mozart™	Arbiter®	IBM's HLLAPI	IBM's APPC™ or CPI-C™
Processing Topologies Supported						
SAA CUA Interface for existing 3270 applications:						
Under PC/DOS	Yes	No	No	No	No	No
Under OS/2	Yes	Yes	Yes	No	No	No
Transition from PC/DOS to OS/2	Yes	No	?	No	No	No
3270 Communications	Yes	Yes	Yes	No	Yes	No
Peer-to-Peer Communications:						
for extending existing 3270 applications	Yes	No	No	No	No	No
for new applications	Yes	No	No	Yes	No	Yes
Maintenance of PC applications & data from a central library	Yes	No	No	No	No	No
Background file transfer in PC/DOS	Yes	No	No	No	No	No
Background peer-to-peer processing in PC/DOS	Yes	No	No	No	No	No
Object Orientation	Yes	Yes	No	No	No	No
CASE/Application Generation	Yes	No	No	No	No	No
SAA CUA Support						
All functions supported on PC/DOS:	Yes	No	No	No	No	No
Action Bar	Yes	*	Yes	No	No	No
Pull-down menus	Yes	*	Yes	No	No	No
Pop-up menus	Yes	*	Yes	No	No	No
Messages and Prompts	Yes	*	Yes	No	No	No
Dialog Boxes	Yes	*	Yes	No	No	No
Forms	Yes	*	Yes	No	No	No
Direct support for multiple levels of action bars and pull-downs	Yes	*	No	No	No	No
Action bars and Pull-downs in a form	Yes	*	No	No	No	No
Single and multiple selection menus	Yes	*	No	No	No	No
Menus and Lists within a form	Yes	*	No	No	No	No
CUA defined help	Yes	*	No	No	No	No
Development System Features: available without programming						
Field-level context-sensitive help	Yes	No	Yes	No	No	No
Optional learning mode (help always displayed)	Yes	No	No	No	No	No
Embedded User Assistance (pop-up selection lists)	Yes	No	No	No	No	No
Dictionary for storage and re-use of definitions & documentation	Yes	No	No	No	No	No
Data Editing/Validation:						
Data type/mask checking	Yes	No	Yes	No	No	No
Range/limit checking	Yes	No	No	No	No	No
Date formatting/checking	Yes	No	No	No	No	No
Validation against database files	Yes	No	No	No	No	No
Required fields	Yes	No	No	No	No	No
"Must Fill" fields	Yes	No	No	No	No	No
Zero not valid fields	Yes	No	No	No	No	No
Multiple validation points during PC processing of transaction form	Yes	No	No	No	No	No
Complete local application testing, database maintenance, interface testing, and mainframe communications simulation	Yes	No	No	No	No	No
Language Objects Available Without Low Level Programming						
Display and selection from:						
In-memory lists	Yes	Yes	Yes	No	No	No
File lists	Yes	No	Yes	No	No	No
Database lists	Yes	No	Yes	No	No	No
Menu display and selection	Yes	No	Yes	No	No	No
Help at all levels: (Panel, Action bar, Menu, Form, & Field)	Yes	No	Yes	No	No	No
Error Processing	Yes	No	Yes	No	No	No
Add/update/delete/locate on:						
Sequential files	Yes	Yes	Yes	No	No	No
Database files	Yes	No	Yes	No	No	No
Host logon sequence	Yes	No	No	No	No	No
Determining 3270 screen identification	Yes	No	Yes	No	No	No
Read/Write all fields on 3270 screen with a single command	Yes	No	No	No	No	No
Determine dynamic 3270 field attribute changes	Yes	No	No	No	No	No
Dynamic modification of field attributes based on form entries						
Initial values displayed	Yes	No	No	No	No	No
Protected/unprotected fields	Yes	No	No	No	No	No
Development Environment Comparison						
Object Orientation	Yes	Yes	No	No	No	No
Dictionary and documentation	Yes	No	No	No	No	No
Panel/Form painter for Creation/Maintenance	Yes	Yes	Yes	No	No	No
3270 screen capture: Picture and attributes	Yes	No	No	No	No	No
Application Generation (CASE)	Yes	No	No	No	No	No
Intelligent editor (language sensitive)	Yes	No	No	No	No	No
System/user defined templates	Yes	No	No	No	No	No
Integrated compile/test/debug	Yes	No	No	No	No	No
Keyboard re-mapping	Yes	Yes	Yes	No	No	No
Compiled environment	Yes	Yes	Yes	No	No	No
Execution-time source debugging	Yes	Some	No	No	No	No
Host Environments Supported for Peer to Peer						
MVS - CICS	Yes	No	No	Yes	No	No
MVS - IDMS/DC	Yes	No	No	No	No	No
MVS / TSO	Yes	No	No	No	No	No
DOS / VSE-CICS	Yes	No	No	Yes	No	No
VM / CMS	Yes	No	No	Yes	No	No
DEC VAX / VMS	Yes	No	No	No	No	No
Minimum PC Hardware Requirements: IBM XT / Clone, 640k	Yes	Yes	Yes	Yes	Yes	Yes

*Easel does not support the SAA CUA style interface under PC/DOS only under OS/2.

Every effort to present an accurate chart has been made, however no guarantee can be made (8/7/89). Super-Link® is a registered trademark of Multi Soft, Inc., Lawrenceville, NJ., Mozart™ is a trademark of Aspen Research. Easel™ is a trademark of Interactive Images, Inc. Arbiter® is a registered trademark of Tangram Systems.

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VAX guardian suits DEC style

BY MARYFRAN JOHNSON
CW STAFF

MARLBORO, Mass. — Bob Glorioso likes to be called "The Environmentalist," but it is not birds and bunnies he has in mind.

The vice-president of high-end systems at Digital Equipment Corp. — the man behind the VAX 9000 mainframe — picked up that subtitle from a former boss who commented on Glorioso's management style.

DEC's Glorioso

"I trust people. I believe everyone wants to contribute, can contribute, and given the right environment, they will," Glorioso said. "People have to be able to express themselves without fear of reprisals."

Well respected by his colleagues as a scientist and engineer, the 48-year-old former college professor is portrayed by co-workers as an affable leader, politically astute enough to handle the DEC bureaucracy and visionary enough to inspire commitments to a seven-year project.

"Bob loves people who are bright, who make things happen," said Rich Whitman, product manager for the VAX 9000. "He likes risk-takers. If you're hard-charging, he's the best boss in the world to work for."

A major departure for DEC in its handling of the mainframe project was the involvement of marketing people right from the start, Whitman noted: "Bob did that so we were designing a machine that customers wanted."

Glorioso joined DEC as a consulting engineer in 1976, leaving a job as associate professor of electrical and computer engineering at the University of Massachusetts in Amherst.

In 1981, Glorioso was recruited to manage the faltering VAX 8600 project by Gordon Bell, the acknowledged "father" of DEC's VAX architecture and now chief scientist at Stardent Computers, Inc.

"Basically, he's just a very driven guy, very interested in product [development]," Bell recalled. "He knew the technology and the product. Those kind of managers tend to do well at DEC."

While working with his engineers to iron out technical bugs in the VAX 8600 design, Glorioso formed a team of five DEC engineers and managers to start advance development work on the mainframe VAX.

The project was formally launched in April 1984, the year Glorioso became manager of high-performance systems. He was promoted to vice-president of the division in 1985.

While the most imposing hurdles to the mainframe project were technical ones, there were political and cultural stumbling blocks as well.

"Bob had to sell the vision of a mainframe VAX to people who would have preferred to stay in a safe midrange niche," said Peter Schay, once a DEC employee and now a vice-president at Gartner Group, Inc. in Stamford, Conn.

To make sure the right software would be developed to fuel the mainframe VAX for commercial sales, Glorioso managed to move DEC's on-line transaction processing program into his own systems group.

"That was a major political coup," Schay noted.

When the VAX 9000 was announced last month, industry watchers also took note of the formation of sales account teams to peddle the mainframe.

"That development is not at all trivial," said Robert Cameron, a senior analyst at Dataquest, Inc. in San Jose, Calif. "Big accounts, multiregional, multidivisional accounts need that help from the vendor to cross their own organizational structures. DEC is giving customers better access, which parallels MIS expectations. It's the way they're used to dealing with IBM."

DEC also began hiring ex-IBMers, particularly in sales and support, said Terry Shannon, an analyst at International Data Corp. in Framingham, Mass.

"DEC knows they aren't selling just another VAX," Shannon said. "They're fully aware of the longer sales cycles, the different class of clients, with different needs and prerequisites."

In the labor and delivery of the mainframe VAX, Glorioso said he watched the birth of a cultural change at DEC. "There were *thinking* changes that took place, through the company as a whole and in the way we service customers," he said. "If you sell in the commercial marketplace, you have to do it directly."

Imageplus undergoes paperless pilot project

ON SITE

BY ROSEMARY HAMILTON
CW STAFF

BOSTON — Maybe the paperless office is just a myth. If so, then the Putnam Co., like any other company, will never achieve it. But if nothing else, the Boston-based financial services firm is becoming a much less cluttered office environment.

Putnam is the site of the latest pilot project for the IBM Imageplus imaging system. Earlier this month, the company went live with the IBM system for its clerical operations in its Shareholder Priority Processing department.

Forty workstations are up and running now, and the plan is to spread the technology into other departments and other applications areas over the next 18 months. By mid-1991, Putnam should have close to 400 image workstations on-line, said Gavan Taylor, senior vice-president of the information systems division.

The system consists of an IBM 3090 Model 200S mainframe running Imageplus software under the IBM MVS/ESA operating system, as well as IBM Personal System/2s supporting workstation-based Imageplus software. The workstations are tapped into the mainframe via IBM Token-Ring local-area networks.

The mainframe software maintains the images, prioritizes them, downloads them to the workstations and keeps a history on all activity associated with an individual image. The workstation software allows a user to view the image and manipulate it as needed. For example, portions of a document can be enlarged, or an entire image can be rotated or displayed as a negative.

For the next several months, Putnam will use both the imaging system and its old document management system until the company is comfortable enough to rely solely on imaging. As a result, incoming documents are now scanned for the image system and filmed for traditional microfiche storage.

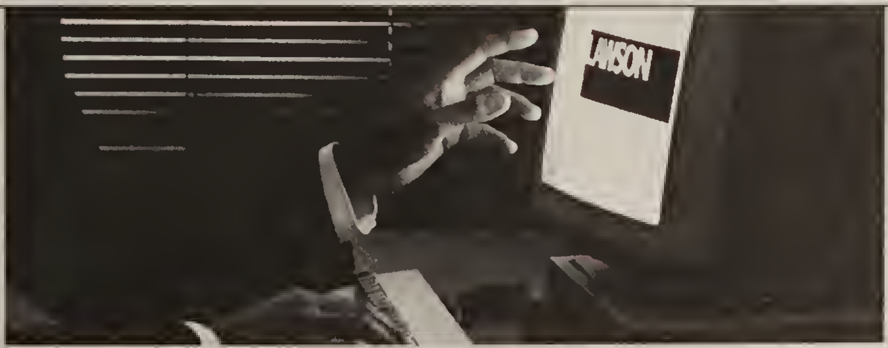
So far, Putnam is giving both IBM and its mainframe-based imaging system a thumbs-up. Taylor and his crew report no major glitches in the project and said that as a result, the implementation has been right on schedule.

Because the implementation has gone relatively smoothly, the clerical portion of the Shareholder Priority Processing Department is operating without paper. The group handles incoming correspondence from shareholders, and the department's work consists of account updates, changes of client addresses and funds transfers.

Putnam's business seems to have been tailor-made for imaging. The company, which manages $42 billion in mutual funds and pension accounts, moves 35,000 pieces of paper a day, according to Taylor.

A large chunk of that paper is handwritten correspondence from shareholders. The handwriting can be miserable; in addition, the paper itself comes in

Continued on page 28



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Imageplus

CONTINUED FROM PAGE 25

various sizes and conditions. In short, working with this correspondence can certainly turn out to be an unpleasant task.

Before the move to imaging, clerical workers handled stacks of shareholder letters, called up accounts and keyed in the requested changes. These days, Putnam's clerical workers sit before an IBM workstation and, using split-screen capabilities, work with both the document's image and the client's account record.

The image displays the changes requested by the customer. The clerical worker then keys them into the account record. There is no paper-shuffling and there is no squinting to read bad handwriting.

A 'softness' for Wang

Selecting the IBM system earlier this year came after a review of several other imaging system vendors, including Wang Laboratories, Inc. Taylor once worked for Wang and had a "softness" for it in this evaluation. But the continuing questions surrounding the minicomputer maker's financial stability finally steered Putnam away.

According to Taylor, the selection of a solid vendor was perhaps the most critical factor because Putnam was planning on putting close to $10 million on the line. In the end, it was IBM that gave Putnam this confidence.

THE SELECTION OF a solid vendor was perhaps the most critical factor because Putnam was planning on putting close to $10 million on the line. In the end, it was IBM that gave Putnam this confidence.

Directional

CONTINUED FROM PAGE 23

with information systems executives, the full results of which are slated to be published in an Open Systems Directive next month. The directive will guide X/Open's activities and will shape the evolution of its Portability Guide, a comprehensive set of standards specifications.

One of the first actions was X/Open's decision to license IBM's Systems Application Architecture Communications Interface, a direct result of a demand expressed for connectivity and data interchange with the large installed base of IBM systems.

"Open systems is catching on," Sikon noted, but "people haven't worked out yet how to get there. That's the challenge: how to start taking down mainframe systems and putting them on more cost-effective platforms." The open systems movement "goes far beyond Unix," Sikon added, to include such things as the X Window interface, file formats and electronic mail.

The overview document lists 10 key areas for standards work including the operating system environment; human interface; system administration and management; and distributed applications.

Standards for a graphical user interface (GUI) topped the list of concerns, according to X/Open and attendees at the conference. GUIs represent the "next wave of development," Wigley maintained, "and we don't want to have eight or 10 of these."

DHL's Sikon agreed. "We would all like to see the vacillating come to an end," he said. "People are worried that they will pick the wrong solution, but in the meantime, we're living without."

Tough GUI to crack

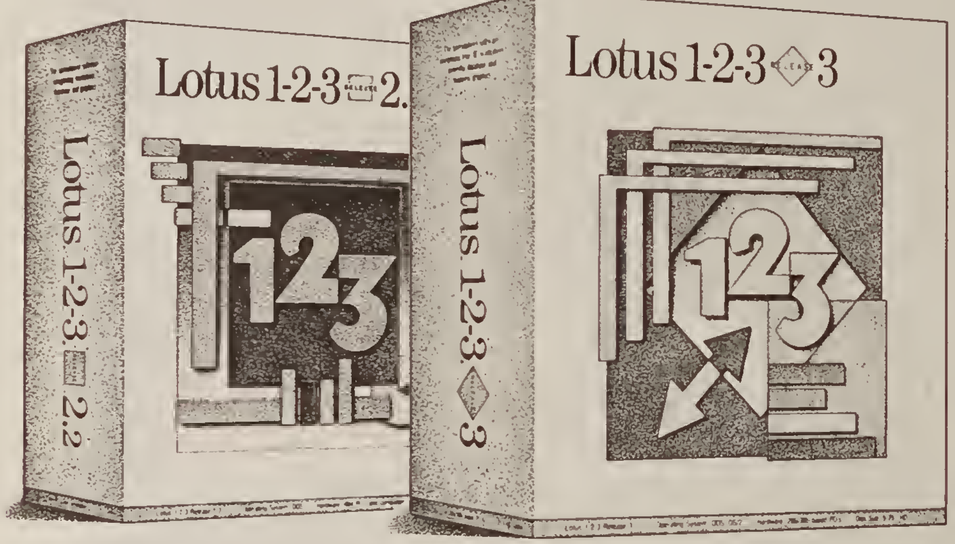
X/Open officials concede that the GUI issue is tough. At the recent Unix Expo, Mike Lambert, X/Open's chief technical officer, said that the group was not able to agree on a GUI standard. In the meantime, some large users, such as American Airlines, are sticking with the X Window standard.

Executives who participated in the Montreal conference agreed that it was a significant step in bringing together users in an organized working session to hammer out requirements. Many were surprised to find how much consensus existed in terms of requirements and how others were struggling with the same issues.

Keatley said that despite the diverse backgrounds of the participating firms, the same sentiments were echoed again and again. Keatley, who took part in a special-interest group on operating systems, said participants shared a need for concurrency and multiprocessing, among others.

For DHL, "standardizing the application interface with communications has been the single biggest problem," according to Sikon. Different vendors have implemented communications protocols quite differently, he said. For instance, he noted that there are at least three ways to implement Transmission Control Protocol/Internet Protocol. "The net effect is if you happen to be writing software for that, there is not a standard way to get at them. We've spent a lot more time than necessary to come up with unique code for each vendor," he said.

1-800-624-0503



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Hamilton

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According to Low, there were two disk drive efforts under way at the same time, and the only difference between them was the lubricant. One used the same lubricant used on the disks for the 3380K drive, and the other was a newer lubricant.

Now, one can assume that if this was the only difference, there must have been some focus on the lubricant. There must have been a good reason to try a different one. Was it cheaper? Did it improve performance?

When Low was asked what advantage the new lubricant offered, he said that it appeared at first to have better sliding friction but then added that it actually turned out to have no advantage. When asked if the disk drive lost something when IBM elected not to use this new lubricant, he said, "Absolutely not."

Then, when Low was asked why IBM was using this lubricant in the first place, he said he hadn't determined why.

So are we to assume that a company as smart as IBM was messing around with a different lubricant for the heck of it? Are we to assume that decisions are made, willy-nilly, on a project as important as this disk drive — a product that could bring in revenue in the multi-billion-dollar range?

I placed a call to the IBM public relations office and said that Low's answers really didn't sound good. Perhaps he would like to clarify them. An IBM spokeswoman said the reason Low said he hadn't determined why the lubricant was used in the first place was because, as president of the division, he doesn't have a hands-on role in these engineering projects.

Good answer — except that it doesn't fit with something else Low said. At the tail end of the interview with him, he was asked if there would be a reprimand for the person responsible for this technical problem. Low said, "That was me."

Well, maybe that was the sort of answer from a division chief that, in effect, says, "The buck stops here." If not, we have a situation that stirs up the question: This isn't adding up, so is there something you're not telling us?

One thing the IBM spokeswoman pointed out a number of times is that Low is a scientist first and foremost. The implication is that he is not as slick as the typical IBM marketing executive who knows what kinds of answers to give the press.

Maybe so. Maybe Low is a stereotypical scientist who's more comfortable in technical discussions rather than question-and-answer exchanges.

I sure hope so. Because if he's not the stereotypical scientist, then we have a story from IBM with a few holes in it. And that means every 3390 customer had better be checking those disk drives very closely.

Hamilton is *Computerworld's* senior editor, systems.

HARD BITS

Intergraph chip package powers image processor

Intergraph Corp.'s Advanced Processor Division said Philips Systeme & Sondertechnik in Bermen, West Germany, has designed an image processing system powered by the Clipper microprocessor. Clipper is Intergraph's reduced instruction set computing chip. The image processing system is based on 20 Clipper microprocessors.

Digital Equipment Corp. and **Deloitte Haskins & Sells** have teamed up to jointly provide systems integration services. The nonexclusive deal covers the full range of services provided by Deloitte Haskins as well as the full DEC product line.

Tandem Computers, Inc. signed a licensing agreement with Array Technology Corp. that gives it the right to develop and manufacture disk subsystems based on Array's technology, which is geared toward high availability by packaging redundant arrays of inexpensive disks. Tandem is said to be the first systems company to license this technology.

Data General Corp. signed up Vykor Technology as a reseller of its Aviion systems. Vykor will package Aviion systems with scanning, imaging and communications applications and claims to interoperate with Digital Equipment Corp., IBM and Wang Laboratories, Inc. equipment.

Comdisco Disaster Recovery Services, Inc. said it is beefing up three of its recovery facilities. Both its Grand Prairie, Texas, and San Ramon, Calif., facilities will get an IBM 3090 Model 200E mainframe and associated peripherals this month. Meanwhile, its Carlstadt, N.J., facility will receive an IBM 3090 Model 600S.

Unisys Corp. announced that Hall-Mark Electronics Corp. will distribute its line of Unix systems based on what was the Convergent S/Series and is now part of the Unisys Unix-based product line.

Why Experienced Computer Users Don't Think Very Much About Modems

Our research shows that knowledgeable MIS managers, PC coordinators, and end users simply don't want to think of modems at all.

Not exactly what modem makers relish hearing! But it's hardly surprising that you want to save your thinking for bigger and more important things.

Modems are a lot like plumbing. As long as the data is flowing, they're practically invisible. However, when something goes wrong, those little boxes are just lavished with attention.

By then, you've lost data, time, money, and perhaps an opportunity. Both senders and receivers are dismayed and disarrayed.

Fortunately, there are simple ways to limit this aggravation. Our research suggests a few points to keep in mind.

The cost of the modem is not the modem's cost.

The fixed price of the modem is relatively insignificant. Ongoing costs matter far more.

In the long run, for example, a high-speed modem can save you a small fortune on phone bills. More data sent in less time means less money to the phone company.

You can also save with more reliable and robust modems that communicate over a wide range of telephone line conditions.

Resending data costs both time and money. The less time you spend transmitting data, the more time you have to spend on your business.

Downtime and adaptation time can also cost you dearly.

Be sure to ask if the modems are compatible with their earlier generations. You don't want to start with suppliers who regularly obsolete their own products, or who don't offer you an upgrade path.

Modem support can be a real hassle with the wrong vendor.

Setting up and installing your modem can affect both your budget and your sanity. Many manufacturers forget to make their modems easy to use!

This becomes expensive when you want to start up fast or need to support a large number of users.

Dip switches, on-line help screens, and easy-to-use manuals should be demanded. It also helps to have a quick-reference guide printed on the bottom of the case.

In sticky situations, it's vital to have toll-free support and applications engineering.

Bottom line:
The data must get through.

A bit of data traveling from your computer is converted by your modem and sent to your local telephone office.

From there, it is exposed to the vagaries of phone lines, various transmission media, and weather patterns.

They all conspire to corrupt your data and slow down your throughput.

All modems are not created equal; some are less sensitive to noise and have better error-correcting protocols.

Some are simply more robust and have better filters.

Modems are more than mere commodities — technology does count.

"When things go wrong, I want the supplier there."

That's when you need the *right* supplier on board. Look for one who gives fast turnaround time on repairs and adjustments, and who doesn't vanish after the sale.

Look for a company with history and promise — one that's here today and here tomorrow.

Not everyone needs the same modem.

The best way to keep modems from wasting your time and money is to buy them from a reliable supplier with a broad product line. Those with limited lines sometimes try to cram square pegs into round holes.

People with differing applications have differing requirements. Dealing with a broad-line supplier simplifies ordering, reduces training/support time and cost, and limits hassle and coordination.

In the end, if you give enough consideration to choosing the right supplier, you'll hardly have to give modems any thought at all.

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NEW PRODUCTS — SOFTWARE

Utilities

Velocity Software, Inc. has announced XASSD, an IBM VM/XA solid-state disk support software.

According to the company, the product adds support to the VM/XA SP Control Program for solid-state disk devices and expands the VM/XA paging hierarchy to allow these devices to be treated preferentially. Operator controls are included to permit disk allocation control on either a global or individual user basis. XASSD is available for a $6,000 annual fee, and a 30-day free trial is provided for evaluation purposes.

Velocity Software
60 Alban St.
Boston, Mass. 02124
617-825-3599

New Generation Software, Inc. has added an uninterruptible power supply automatic-power-down function to its Home Free software for the IBM Application System/400 computer.

The software interface performs a normal power-down before receiving the AS/400's "battery weak" signal, the firm said. A standard version of the product is also available without the UPS interface function. Pricing ranges from $295 to $795 depending on CPU model number and selected software version.

New Generation
Suite 195
1010 Hurley Way
Sacramento, Calif. 25825
916-920-2200

Leeds Associates, Inc. has announced a software product designed to increase processing speed and reduce the response time for most IBM mainframe applications running with VSAM.

Called MIS-Turbo, the product reportedly generates optimum statistics from its database facility to produce the recommended changes without affecting the application codes. The product's cost can be fixed at an hourly rate or established at a final contract price, depending on the client's preference.

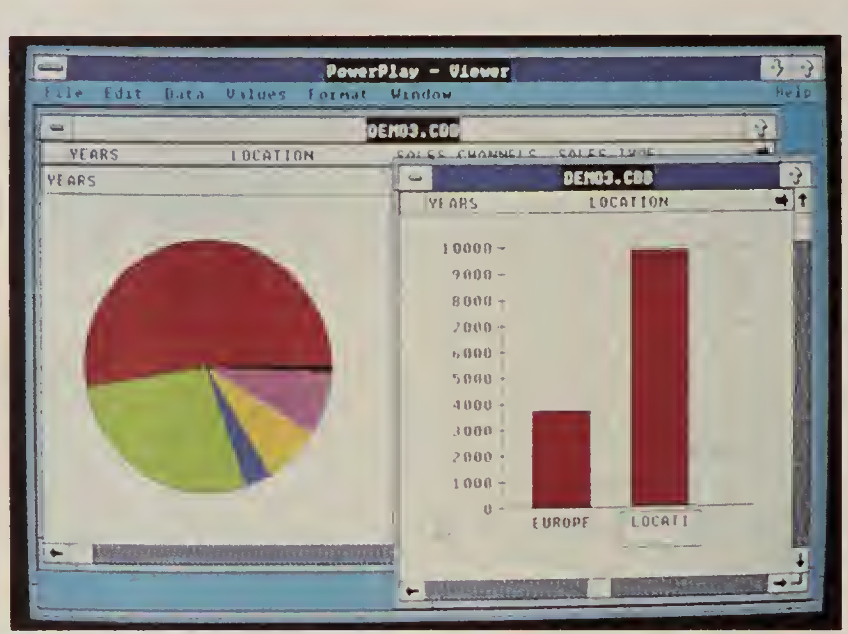
Leeds Associates
5 Alma Rock Road
Stamford, Conn. 06903
203-322-3516

Applications packages

GE Information Services (GEIS) has introduced a credit management system developed specifically for retailers running internal credit operations.

Called Credit*Pro, the integrated software provides the retailer with an ongoing summary of customer buying patterns, the company said. It is capable of collecting customer data and connecting to credit bureaus as well as scoring applications. Other functions reportedly include authorizations, mailing lists, promotions, accounts receivable and collections. The full software package is available for a license fee, which includes installation and support. Modules are also sold individually.

GEIS
401 N. Washington St.
Rockville, Md. 20850
800-433-3683



Cognos' Powerplay *analyzes detailed VAX/VMS information*

An end-user reporting and analysis tool for managers and other decision-making personnel has been announced by Cognos, Inc.

Designed to provide access to corporate data from the desktop, Powerplay is scheduled for release in January 1990 and will initially be available for Digital Equipment Corp. VAX/VMS personal computer platforms. The software employs a graphic format and multidimensional approach to information analysis that allows the user to view and report on corporate information at increasing levels of detail. The company is also offering Inquizative, a menu-driven report writing program for generating list style reports.

Powerplay offers an unlimited number of categories and will be priced at $995 for each PC and at $15,000 for the host component. Users will be able to run the product as either a stand-alone package on the PC or in conjunction with the host machine.

Pricing for Inquizative and the VAX/VMS environment will range from $3,500 to $14,000, depending on machine configuration.

Cognos
3755 Riverside Drive
Ottawa, Ont., Canada
K1G 3Z4
613-738-1440

Interactive Software Services, Inc. has announced Amis, a decision-support software system developed to run in an IBM Application System/400 environment.The system permits managers to manipulate raw data for use in strategic analysis and forecasting. It can use information from any application residing on the AS/400, according to the vendor.

Report writing and on-line viewing functions are included, and the software is priced from $25,000 to $50,000.

Training and hot line support are also provided.

Interactive Software Services
Suite 306
4825 N. Scott St.
Schiller Park, Ill. 60176
312-671-4450

Tower Systems International has announced an automated system designed to manage console message traffic in an IBM VM (CMS, MVS, VSE) environment.

Called Epic/Auto-Op, the software allows all messages to be managed and controlled from one centralized console or from several consoles via filters or windows, the vendor said. Filters may automatically respond to messages without operator intervention or hold messages on the screen until they receive a response. Messages may be highlighted with color, flashing or by sounding an alarm. Depending on CPU group, pricing ranges from $8,300 to $28,800.

Tower Systems
2220 Fairview Road
Costa Mesa, Calif. 92627
800-854-7551

A maintenance control software system developed specifically for the IBM System/36 and Application System/400 series of minicomputers has been announced by SDC Software, Inc.

The package was designed to manage maintenance tasks in a facilities or fleet environment and incorporates scheduling, purchasing and inventory modules. The license fee for the complete system is $11,500, which includes source code. Modules may also be purchased as separate packages.

SDC Software
P.O. Box 3360
Carson City, Nev. 89702
702-883-9339

NEW PRODUCTS — SYSTEMS

Processors

Prime Computer, Inc. has announced the introduction of a low-end multiuser commercial system for Unix-based application programs.

The Prime EXL MBX Plus utilizes a 25-MHz 80386 microprocessor from Intel Corp. and can reportedly support up to 32 users.

A basic configuration for the system includes an 80386 processor, 4M bytes of memory, a 1.2M-byte floppy disk drive and a 94M-byte hard disk drive. The price for this basic system is $9,800.

Prime
Prime Park Way
Natick, Mass. 01760
508-655-8000

Sky Computers, Inc. has introduced an Intel Corp. I860/I960-based reduced instruction set computing application accelerator board.

The single-board Skybolt reportedly combines the two microprocessors to provide 40 million instructions per second and 80 million floating-point operations per second of computational power for Sun Microsystems, Inc. workstations and Digital Equipment Corp. VME-based systems. The board was designed for scientific and engineering desktop applications.

Pricing starts at $12,240, and OEM and system integrator discounts are available.

Sky Computers
27 Industrial Ave.
Chelmsford, Mass. 01824
508-250-1920

Data storage

Maximum Strategy, Inc. has announced the Strategy HSC Storage System for the ANSI high-speed channel supercomputing environment.

The product has a storage capacity scalable to 300G bytes and a sustained throughput scalable to 160M byte/sec. It incorporates a proprietary disk array technology and is field-upgradable to support the user's growth requirements, the vendor said. Deliveries are scheduled for the first quarter of 1990. Pricing will start at $200,000.

Maximum Strategy
1650-B Berryessa Road
San Jose, Calif. 95133
408-729-1526

An 8 mm helical-scan tape subsystem created to provide unattended backup for Digital Equipment Corp. Vaxcluster computers has been announced by Transitional Technology, Inc.

The CTS-800 series supports as much as 32G bytes of storage per Hierarchical Storage Controller tape data channel, the company said. The drive has a 15M byte/min. data transfer rate and supports full copying and backup commands. The series is offered in a variety of configurations, priced from $16,000 to $160,000. Leasing options are available.

Transitional Technology
Suite 204
1411 N. Batavia
Orange, Calif. 92667
714-744-1030

Distributed Logic Corp. (Dilog) has introduced two host adapter boards that provide single-ended small computer systems interface (SCSI) capabilities for connecting multiple disk and tape drives to Digital Equipment Corp. Microvax III systems.

The SQ3706A Host Adapter permits the connection of as many as seven SCSI disk drives to the host computer, while the SQ3703A Host Adapter allows interfacing of up to seven tape drives or tape emulation devices per system. Both quad-sized boards incorporate a 64K-byte data buffer and sell for $1,650 each.

Dilog
1555 S. Sinclair St.
Anaheim, Calif. 92806
714-937-5700

American Digital Systems, Inc. has announced a tape backup system designed to support Digital Equipment Corp.'s HSC40, HSC50 and HSC70 hierarchical storage controllers.

The Mastertape II/HSC 8 mm backup system is available in configurations with one to four 8 mm tape drives, coupled to a small computer systems interface-to-tape data channel protocol converter. The basic version provides as much as 2.3G bytes of storage on a single HSC data channel port and up to 36.8G bytes per HSC tape data channel card, the firm said. The product costs $24,000.

American Digital Systems
490 Boston Post Road
Sudbury, Mass. 01776
508-443-7711

A 600M-byte direct-access storage device subsystem for the IBM Application System/400 platform has been announced by EMC Corp.

The SL/932-XP has an average seek time of 16 msec and can be mounted in the IBM AS/400 cabinet, the IBM 9309 cabinet or an EMC E309 cabinet. The product uses dual actuators and dedicates one actuator per 300M bytes, the vendor said. It is backed by a one-year warranty, and site-tailored service programs are available. The SL/932-XP costs $15,600.

EMC
171 South St.
Hopkinton, Mass. 01748
508-435-1000

PCs & WORKSTATIONS

SMALL TALK

Patricia Keefe

Wading in SQL mire

Get out your slickers and Wellingtons. The mud is flying pretty thick out here in the SQL server wars. And after you read this, you'll probably agree that most of the parties involved should be tossed headlong into a vat of their own muck.

The three leading Desktop SQL server vendors have all released benchmark tests, and at least two of them — Gupta Technologies, Inc. and Oracle Corp.— reportedly have a bizzare clause in their licensing agreements that prohibits licensees, whoever they are, from publishing any benchmarks without the vendor's permission.

Gupta claims that a third — Sybase, Inc. — has a similar clause. Which is interesting

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Inside

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Bus drivers clash over speed

Verbal sparks fly over differing EISA, MCA performance claims

ANALYSIS

BY PATRICIA KEEFE
CW STAFF

LAS VEGAS — Users and analysts may not perceive much difference between the two buses slugging it out for control of the 32-bit desktop, but to listen to IBM and Compaq Computer Corp., there's a world of difference worth fighting over, particularly in the speed zone.

The sparks flew at a recent Comdex/Fall '89 panel entitled "MCA vs. EISA: Which Bus Will Users Ride?" The session consisted of Robert Carberry, IBM's Micro Channel Architecture (MCA) evangelist, vs. Gary Stimac, Compaq's senior vice-president of systems engineering and resident Extended Industry Standard Architecture (EISA) expert.

"There is no one winner," said panel moderator Seymour Merrin, a consultant and former reseller. He said the issue is about choosing between multiple ways to get to the same destination.

Unlike some of his compatriots, Merrin agrees with IBM and Compaq that EISA and MCA are very different architectures, even down to the trivia level. "The differences are momentual in concept, philosophy and in what they do, how they do and what you end up being able to do," Merrin said. Yet he concludes that there is no war here, just choices for users.

Maybe so, but it is turning out to be a no-holds-barred battle for user dollars.

Compaq dropped the gloves early, taking some clear shots at an IBM briefing that prestaged Compaq's EISA rollout, at which IBM laid out plans for future MCA advancements. "We want to end the bus wars. We want to deliver [products], not just promises," said Stimac. "We think our customers are not interested in future bus specs, just what they can get today and move into the future."

Stimac hammered home Compaq's contention that EISA is evolutionary and builds upon the user investment in ISA, whereas MCA is closed.

In an interview at Comdex, an obviously annoyed Carberry stopped short of calling Compaq a liar. Users may yawn, but both vendors have good reason to be touchy. The future of the desktop lies in 32-bit data transmission, and so both are rushing to stake claims in a pristine territory only slightly sullied by Unix workstations.

Based on separate interviews with Mike Swavely, president of Compaq North America, and Stimac, Compaq's claims boil down

Continued on page 41

Quantum gets a little egg on disk-drive face

BY RICHARD PASTORE
CW STAFF

Disk-drive maker Quantum Corp.'s name has surfaced quite a bit in the past two months. But to its chagrin, the publicity was generated by product failure rather than the new 1-in.-high OEM drives it unveiled earlier this month (see story page 40).

Beginning in September, some Apple Computer, Inc. Macintosh users reported frequent crashes of their Quantum-made hard disk drives. What followed were weeks of vendor indifference, then acknowledgement, and finally a repair program that has left many users more worried than ever about the health of their Macs.

After users had insisted that something was definitely wrong with their drives, Quantum determined that the lubricant in some of its products had somehow thickened enough to hamper the movement of the actuator arm and cause a drive crash.

The company designed a fix to the device's programmable read-only memory (PROM) that directs more power and extra seek motions to the arm to help it break through and stir up the viscous lubricant.

However, some users' frustrations continued even after the PROM was changed. They voiced concerns that their drives made loud chattering noises and expressed fears that the extra seeks were slowing the drive's access rate or destroying data.

Quantum's Berkley
won't take full blame

One Mac user, who asked not to be identified, said his 4-month-old Mac IICX started making annoyingly loud access noises after a dealer changed the PROM four weeks ago. "The great thing about the Mac IICX was that it was supposed to be such a quiet machine," the user said. "It isn't anymore."

Quantum Chairman and Chief Executive Officer Stephen Berkley tried to put the increasingly embarrassing matter to rest in a recent interview with *Computerworld*.

"The noises you don't normally hear are caused by the additional seeks," Berkley said. With frequent use over a few weeks, the lubricant should thin out enough for the drive to revert to normal operation, he said. He also assured users that the additional

Continued on page 40

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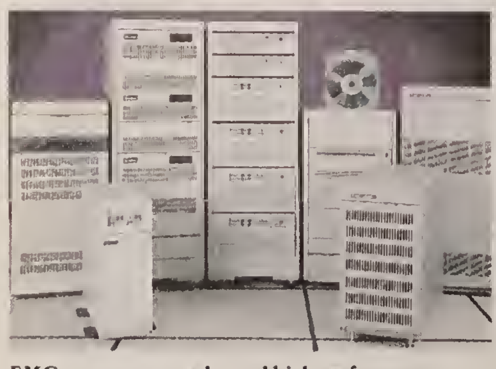

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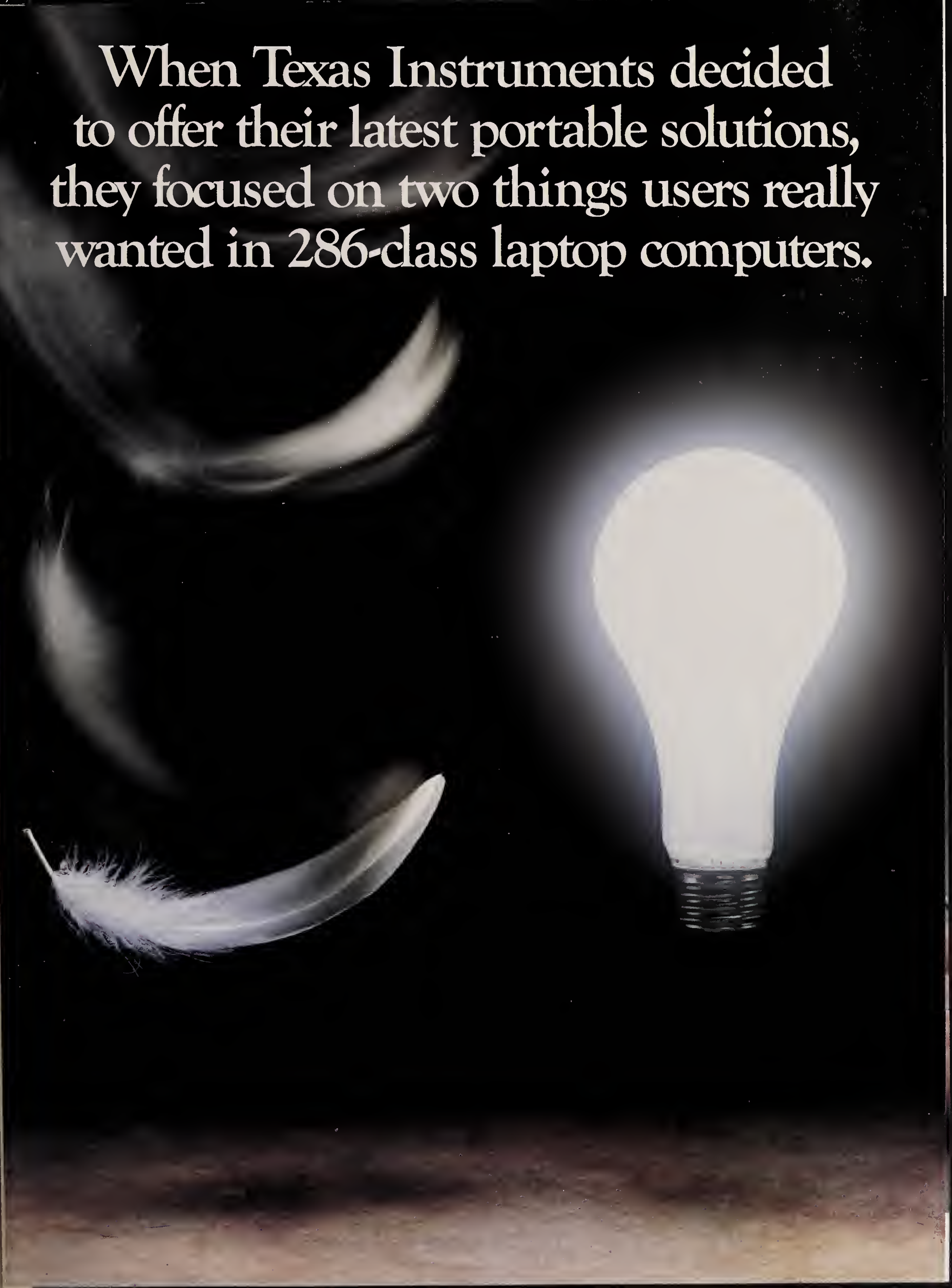
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Louis Vuitton takes on PC style

ON SITE

BY ALAN J. RYAN
CW STAFF

NEW YORK — Standing in line to buy a tube of toothpaste at the local discount store may be at least tolerable to most folks. Standing in line to buy a $600 leather briefcase at a specialty store in Beverly Hills is not.

The toothpaste buyer is likely to be happy that the product is bar-coded so that service at the register is quicker. But customers at the chic store might not accept the technology with the same good humor as their discount department store counterparts. In fact, the customers in Beverly Hills might find the practice of bar-coding, scanning, machine-printed receipts and computerized operations a tad too tacky for specialty stores.

That was precisely the challenge faced by Nadine M. Hayes, manager of Louis Vuitton USA, Inc.'s retail personal computer operations, as she went about the process of automating the Louis Vuitton stores throughout the country.

At Louis Vuitton stores, customers expect personalized service and handwritten receipts.

> "MANY OF the salespeople did not even have experience working with a cash register."
>
> NADINE M. HAYES
> LOUIS VUITTON

"They enjoy the personal touch," Hayes explained. "We have individual salespeople working on the floor to help them with their purchases. We feel that the traditional way of going one-on-one with a customer is, in this country, the better way to go."

Prior to automation, 23 freestanding stores worked entirely on paper systems. The last store was brought into the computer age in June, Hayes said.

Until that time, some of the demographic information requested by the company's Paris-based corporate headquarters was still being done manually. Even though most processes are automated today, the retail areas of the stores remain unchanged.

"The stores have an image," Hayes said. "You can walk into Louis Vuitton stores anywhere in the world, and they all look the same." That attention to detail means upper management looks with a wary eye on changes.

High-tech hideaway

Hayes was mandated to automate the freestanding stores without disrupting the company's established image. Her solution: Install IBM Personal System/2s at most locations in the back room, where customers cannot see them; install software specifically designed for Louis Vuitton; and have the files updated in the store's back room. Information is not gathered in real time; it is entered during a slow point in the day or at the end of the day and then sent in batch form via modem to the company's U.S. headquarters in New York on a weekly basis.

IBM PS/2 Models 50, 50Z and 70 are the predominant hardware choices, Hayes said.

LOUIS VUITTON
MALLETIER A PARIS

The software — designed by Hayes' department and Management Information Solutions, Inc. a consultancy in New York — collects all sales information, repair orders, employee discounts, shipping charges and sales tax information. Users can track sales by the day, week, month or year and through various criteria such as top items sold based on price or volume, type of payment received, or salesperson. The system also tracks information on overstocked or understocked items.

At 16 other Louis Vuitton locations in leased spaces within department stores, the workers use Zenith Supersport 286 laptops with built-in modems because space is limited. Sales information is entered at the end of the workday, Hayes said.

The process of creating the new systems included many challenges. Since the stores use handwritten receipts, "Many of the salespeople did not even have experience working with a cash register," Hayes said. "Some weren't sure they would be able to catch on. I had to make them comfortable while they were learning something new."

Three weeks ago, the stores began sending all of their sales reports through the computer system. Previously, that information was being relayed through human voice over the phone system, she said.

Future challenges include working with the North American sales information to consolidate it demographically and send it directly to Paris over phone lines as well as creating a network. Vuitton also plans to tie together all of the North American-based computers to track transferred goods and use electronic mail.

Disasters shine light on micro recovery system

BY RICHARD PASTORE
CW STAFF

LOS ANGELES — The recent one-two punch delivered by Hurricane Hugo and the San Francisco area earthquake may have personal computer managers thinking more seriously about regularly backing up their data and sending it as far away as possible. At least that is the hope of one new vendor that provides such a service on-line.

Los Angeles-based Secure Data Network, Inc. recently announced the Secure Data Network, an automated on-line data backup and retrieval service for IBM-compatible PCs and PC local-area networks.

Through dial-up connections, the service backs up PC files, encrypts and compresses the data and whisks it away for storage at two remote sites.

Backup benefits

Besides getting the data out of harm's way, the service's key benefit lies in its automation of the backup process. Managers and users would no longer have to remember to do backups or hassle with shipping tapes offsite, said Frank Reed, the firm's executive vice-president.

Once the service's communications software and modem are installed on the PC, the subscriber designates which drives should be backed up and at what hour and interval. After that, the system operates unattended.

At the appointed hour, the system inspects hard disks on the network or file server for new or altered files. These are compressed by about 65% and transmitted over telephone lines to a remote storage site. For redundancy, copies are sent on to a central storage facility.

The service is targeted mainly at small to medium-size businesses, "companies who may not have a data center operation to enforce backup," Reed said.

Texaco Refining and Marketing, Inc. in Wilmington, Calif., is using the system to back up its PC-resident hazardous waste data.

Before the system was installed, data was backed up monthly to tapes that were then stored in the same desk where the PC sat, said a Texaco project engineer who asked not to be identified. "If we ever had a fire in here, forget it. It's gone," he said. Texaco had the option of having a service company pick up tapes on a weekly basis for transport off-site. But that would have been impractical, according to the engineer. "It relies on me to do the backup and give them a call. But you wind up putting out fires in your normal job and never get to it," he said.

'Painless installation'

Texaco spends about $59 per month for the Secure Data Network service, which was installed quickly and painlessly, the engineer said. He has not yet needed to retrieve any data but expects to put that side of the service through a test soon.

Subscribers have on-line access to their stored files 24 hours a day, seven days a week. Secure Data Network will also ship backup files on floppy disk, tape, optical disk or even a hard disk drive on request.

For security reasons, only a subscriber using a personal password can de-encrypt and retrieve data, according to Reed.

To further enhance security, the system keeps an eye on its users. It maintains an audit trail of any overrides that managers might make to its regular backup schedule, conducts an 18-point check for known viruses and alerts subscribers if it detects anything in backup files.

If a virus-infected file is backed up, the encryption process renders the bug inactive, according to Reed. "It can't do anything to the system or to anyone else's data," he said.

Pricing for the service depends on modem transmission rate and whether the customer desires backup override capability, but monthly fees start at $19. One hour of backup time per month is included in the fee; pricing for additional time starts at 5 cents per minute.

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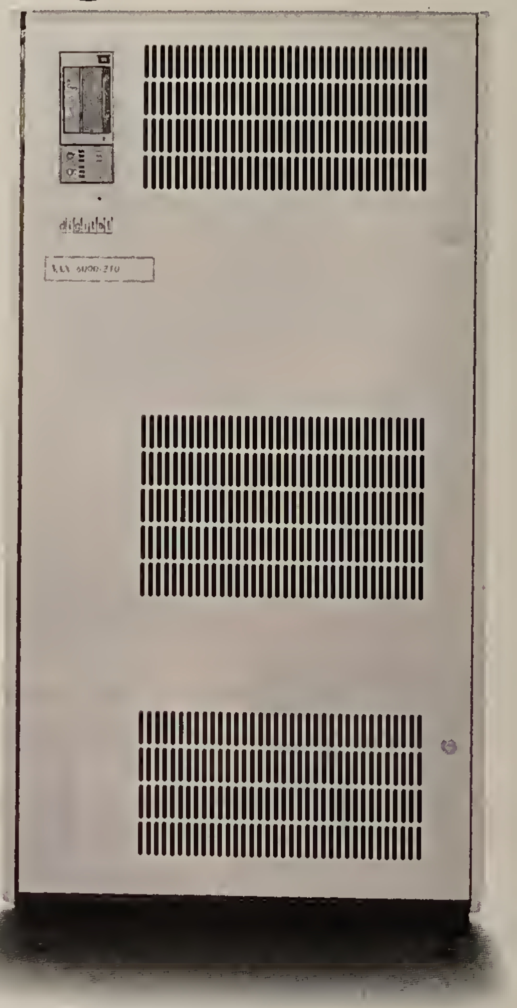

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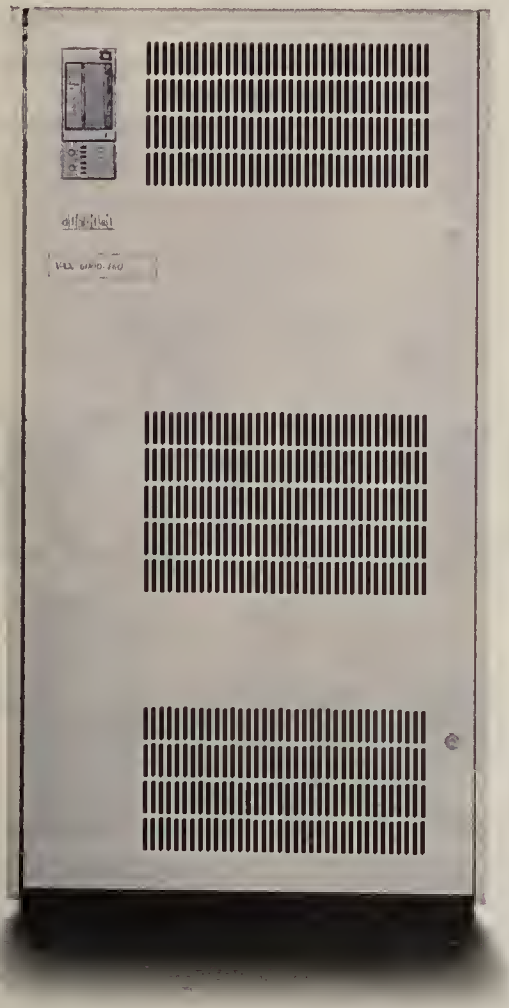

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Quantum

CONTINUED FROM PAGE 33

seeks will not slow access performance since they occur only when the drive is idle.

Berkley partly blamed Apple for user frustrations. Apple did not adequately explain the details of the fix to its customers, he said. He also noted that "for some reason, it took Apple over a month to put a fix program together" after Quantum had discovered a solution.

An Apple spokeswoman said she was not aware of any delay and claimed Apple had worked with Quantum on the problem from the start. She added that only a small percentage of users have reported problems; she would not say how many.

However, bad feelings remain on the part of customers who say this episode is just the latest in a series of Mac drive problems. Some end users took swipes at Apple during a Mac users conference that took place at Comdex/Fall '89 earlier this month.

Richard Emerson, news editor/technical resources at *The Los Angeles Times*, complained about what he called the drives' extremely high failure rate over the course of several years.

"Apple doesn't pay it much attention," Emerson added, "and only Apple is allowed to get away with this. If such a thing happened with IBM equipment, there would be such a howl that it would bring the company to its knees."

> "IF JOHN SCULLEY had been within arm's reach last week, I would have wrung his neck."
>
> AMY WOHL
> WOHL & ASSOCIATES

At least one analyst sides with the users. "It's a problem that is dogging Apple," said Amy Wohl, president of computer consulting firm Amy D. Wohl & Associates in Bala Cynwyd, Pa. "It happened to me just recently. If [Apple chief executive officer] John Sculley had been within arm's reach last week, I would have wrung his neck."

Berkley said the problems may have resulted from the drives' exposure to excessive heat and humidity in Japan, where they are made.

In any case, "the ultimate fix is that we have changed the type of lubricant used in the manufacturing process," Berkley said.

West Coast correspondent James Daly contributed to this report.

Reduce the drive limit

With portable computers losing bulk almost proportionately to their gain in market share, disk drive makers are churning out slimmer versions of the 3½-in. hard disk drive and new models of the 2½-in. units to feed this miniaturization trend.

Quantum Corp. announced four new entries in its 1-in. high, 3½-in. hard drive series earlier this month. The Prodrive units feature capacities of 52M and 105M bytes.

The "low-profile" drives were designed to satisfy a growing OEM desire to downsize machines vertically as well as horizontally. Quantum expects to ship the drives in February.

One type of drive that the firm will not ship in the near future is a 2½-in. model, said Quantum Chairman and Chief Executive Officer Stephen Berkley. Unlike some of its competitors, who are popping up with new 2½-in. models to satisfy the swelling notebook computer market, Quantum is biding its time.

"It's a specialty area with a very low volume right now," Berkley said. But, he noted, "We're developing drives smaller than 3½-in. because in two or three years, not having one will be a competitive disadvantage."

Companies that are not willing to wait include Prairietek Corp., which pioneered the small drive. That firm announced the third member of its 2½-in. family earlier this month.

With power consumption rates that average 0.7 watts and an average seek time of 23 msec, the Prairie 120 single-disk hard drive is said to be faster and more energy-efficient than its predecessors. The single-disk unit packs a capacity of 21.4M bytes, the Longmont, Colo.-based company claimed. Production quantities reportedly will be available in the first quarter of 1990. Pricing for individual units is $550.

Areal Technology, Inc. earlier this month unveiled its second 2½-in. drive of the quarter. The MD-2100 crams up to 100M bytes on a single disk. The Areal drive features average seek times of less than 29 msec, the San Jose, Calif.-based company said. Expected to ship in the first quarter, MD-2100 pricing starts at $795.

RICHARD PASTORE

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Bus drivers

CONTINUED FROM PAGE 33

to the following — some of which are readily apparent and others which are subject to interpretation:

- Standards. Compaq claims MCA is proprietary, while EISA is a continuation of the AT bus, also known as ISA.
- Design factors. IBM uses a smaller, nonstandard card, 90 watts to Compaq's 300 and offers fewer expansion slots.
- Better performance. Compaq claims that only one IBM model vs. all Compaq EISA models separates the I/O bus from the memory processor bus, which provides greater performance.
- Multiple processor support.
- Multiple-disk array controller architecture, which Compaq claimed is not achievable with MCA as it is defined today.

"Our memory processor subsystem in the Systempro can deliver over 10 times the performance of the Model 80 and can grow to 256M bytes — that's 16 times the expandability of current MCA and ISA-based machines," Stimac claimed. In terms of I/O throughput, he said the EISA system provided over 2½ times the available throughput that MCA systems did.

IBM has a few counterclaims of its own, mostly emphasizing the reverse — that EISA is the slower bus:

- Carberry claims EISA runs out of gas at 33 MHz, adding that MCA currently runs at 40 MHz.
- IBM tests found that ISA cards run significantly slower in EISA boxes — as much as seven times slower. This is an issue only because EISA supporters tout backwards compatibility.
- Some ISA cards, such as memory, are incompatible with the EISA bus and some EISA cards do not work in ISA boxes.
- MCA offers users a choice of 16- or 32-bit processing and will extend that to 64-bits; EISA provides 32-bit processing. IBM also claims that its 32-bit cards will run in both its 16- and 32-bit machines. "EISA can't do this," Carberry said.

He was irked with the consortium's claims about backward compatibility. "It's absurd, a facade," he snorted. "No one is going to kneecap a $25,000 machine and forego a performance factor of four [by not buying] a new $2,000 card."

Keefe

CONTINUED FROM PAGE 33

because Microsoft Corp., which is partnered with Sybase and Ashton-Tate to develop an SQL database for OS/2 local-area networks, has charged both Gupta and Oracle with unfair play.

Seems the Gupta and Oracle benchmarks compare their products against Microsoft's SQL Server, but, says Dave Kaplan, Microsoft's SQL product manager, he can't do the same.

By now, you should be asking yourselves, "What are these guys afraid of? What are they hiding?"

Give Microsoft some credit. Kaplan challenges his rivals to release benchmark source code so users can duplicate the results. Otherwise, as Kaplan notes, they might as well be publishing in a vacuum. Microsoft also uses an industry-standard test suite for its benchmark and did its testing on shipping software over a wide range of users.

But we need to go much farther than this. Even if these vendors release their test information, Neal Nelson at Neal Nelson and Associates — which makes its living doing benchmarks — claims these tests are "all bogus" because the tests are all done at different points in time on different architecture machines.

Nelson said that Oracle takes these tests to a ridiculous extreme. He claims Oracle has signed an agreement with Ncube, maker of a supercomputer studded with 2,000 — yes, 2,000 — CPUs, allowing Oracle to benchmark its server on Ncube for a transaction per section test. Now here's a realistic test.

Nelson recently fell into this frustrating morass. He was asked by a federal user to benchmark four database servers: Oracle, Ingres, Informix and Unify. Nelson did so, devising a benchmark that he obviously thinks is a good one. He says he took pains to use the same programmer to implement all four products, using the same queries and the same version of each program running on the same two platforms.

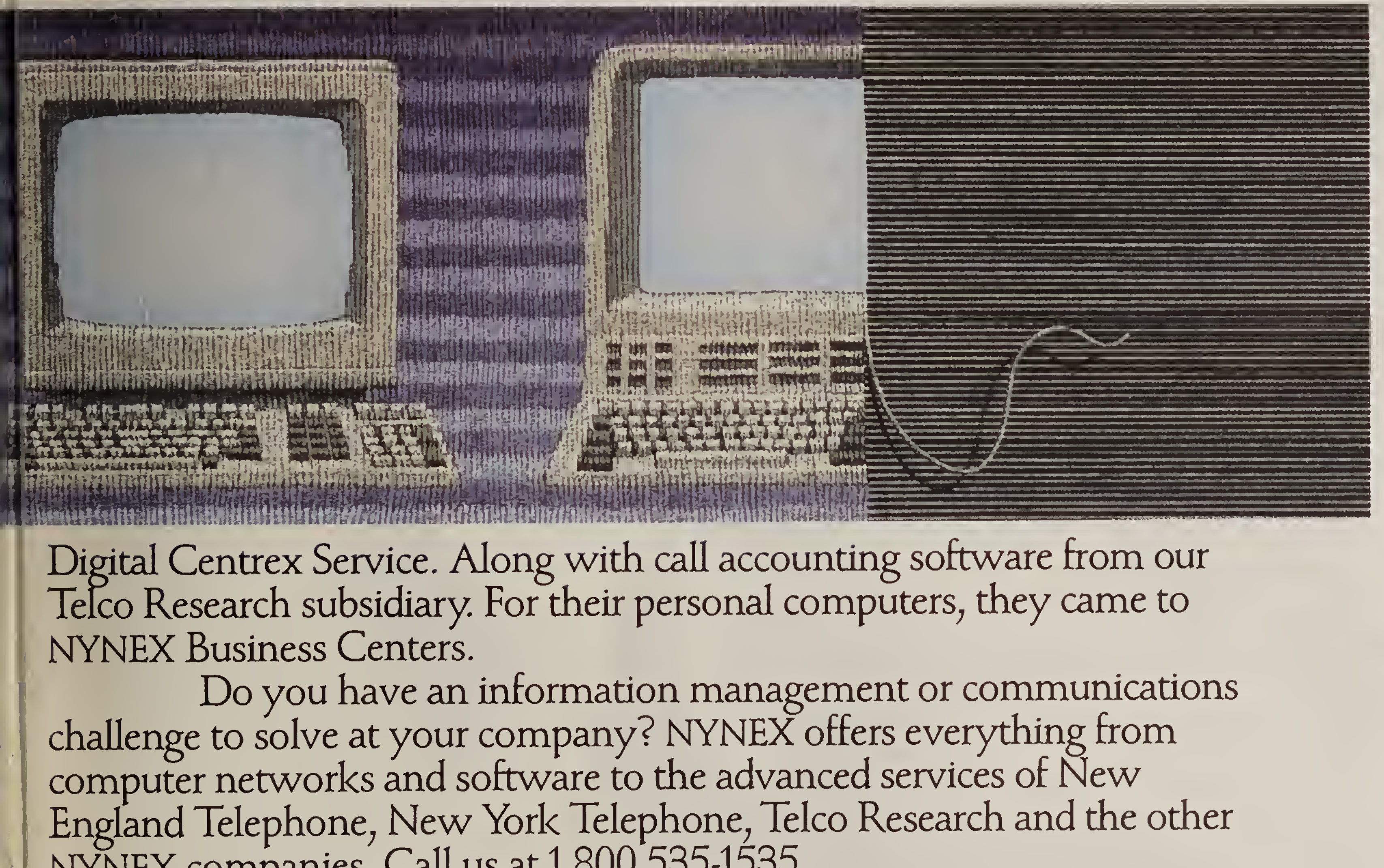
In all, he spent three months testing 75 different things over a range of users. The result is a 305-page report that Nelson can't publish because the vendors involved — who know their own test results but not those of the other three — won't let him do it.

Only Informix has shown any guts (so much for Ingres' — formerly Relational Technology — recent full-page ad in the *Wall Street Journal* slamming what it claimed was marketing hype and mumbo jumbo in the database industry). Sybase volunteered to be tested, agreeing to public disclosure of the results. But when asked to talk to me about it, the firm backed down, Nelson claimed.

"The problem is that we need a fair public comparision, which obviously these companies don't want," Nelson said. So hit 'em where it hurts. Don't let them get away with it. Refuse to buy products from vendors who are afraid to have their products fairly compared to the competition. "As a customer group, we need to get radical and insist on public, impartial benchmarks. It's really scandalous that a vendor would think it can prevent free transfer of test information," Nelson said. Amen.

Keefe is *Computerworld's* senior editor, PCs and workstations.

for Microcom finished.



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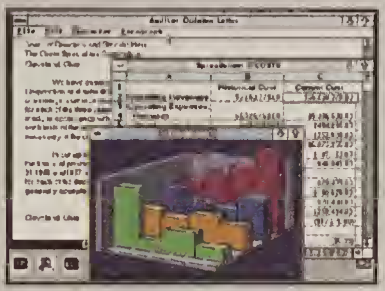

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The word at Comdex: More storage

BY SALLY CUSACK
CW STAFF

Disk-drive vendors waving both promises and products scrambled to outshine one another at this year's Comdex/Fall '89 trade show in Las Vegas with offers of greater storage capacities and faster data transfer rates.

Among the announcements were the following:

- Eastman Kodak Co. presented an automated optical-disc library with 75G bytes of storage capacity. Designated the Model 560, the unit supports as many as five 5¼-in. optical-disc drives and up to 61 6¼-in. International Standards Organization standard or nonstandard disk cartridges, the company said.

The device can be fitted with write-once read-many (WORM) drives, erasable drives or a combination of both.

Kodak also announced that it will manufacture a WORM optical disc capable of storing 8.2G bytes of information — the equivalent of 48 fully loaded reels of magnetic tape.

The products will be compatible with the hardware component of the Kodak 6800 optical-disc system. Availability dates and pricing have not yet been determined, according to a company marketing representative.

- Verbatim Corp., a Kodak subsidiary based in Sunnyvale, Calif., introduced its TMO 5¼-in. double-sided, erasable optical disc available in two versions: the Model 505, which provides 600M bytes of storage; and the Model 510, which has capacity for 650M bytes.

General availability is slated for January, with a suggested list price of $250 per disk.

- A 1.2G-byte, 5¼-in. Winchester disk drive was introduced by Siemens Information Systems, Inc. in Boca Raton, Fla. The Megafile 6200 series offers a 14-msec seek time, the company said, and is scheduled to be available with a small computer systems interface.

Additional features include a 20M bit/sec. transfer rate and a mean time between failure of 100,000 hours. Evaluation units are scheduled for delivery in the first quarter of 1990 and will be priced at $3,000.

- Seagate Technology in Scotts Valley, Calif., announced a 760M-byte, 5¼-in. magnetic disk drive that it claims has an 11.9 msec. access time and a maximum data transfer rate of 3M byte/sec. Christened the Wrenrunner-2, the device is targeted for use in engineering workstations, network file servers and on-line transaction processing environments with high-speed disk requirements.

- Three IBM Micro Channel Architecture-compatible 3½-in. hard disk drives that mount directly in the IBM Personal System/2 Model 50 expansion slots were introduced by Procom Technology, Inc. in Costa Mesa, Calif. The Pira 50-70, 50-100 and 50-200 offer 70M, 100M and 200M bytes of storage, respectively, and are said to be compatible with DOS, OS/2 and Novell, Inc. Netware environments. The Pira series drives are shipped with all hardware, cabling and documentation necessary for plug-and-play installation, and are priced from $1,195 to $2,695. depending on memory configuration.

The company also announced the PXF 2880, a 2.88M-byte floppy disk drive for XT- and AT-type machines. The product reportedly reads, writes and formats 2.88M-byte, 1.44M-byte and 720K-byte floppy diskettes and has a data transfer rate of 1M bit/sec. Priced at $459, the drive comes with a proprietary controller capable of coexisting with any other floppy controller, the company said. The drive is compatible with DOS 3.3 and higher.

- Fujitsu America, Inc. said that its latest generation of disk drives features a mean-time-between-failure rating of 200,000 power-on hours and a five-year warranty. The drives are the 8-in., 2G-byte M2392 and the 5¼-in., 778M-byte M2263 model. In 100-unit quantities, the M2263 costs $1,900, and the M2392 is priced at $8,995. Both prices are quoted in 100-unit quantities.

NEW PRODUCTS

Systems

Headstart Technologies Co. has introduced an IBM-compatible personal computer that reportedly has an animated icon-based interface.

Dubbed the Explorer, the machine comes with 512K bytes of random-access memory, expandable to 768K bytes, the vendor said. It includes a 3½-in. floppy disk drive and an Intel Corp. 8088-1 processor operating at 9.54/4.77 MHz, switchable.

The Explorer carries a a suggested retail price of $599.

Headstart Technologies
Suite 438
40 Cutter Road
Great Neck, N.Y. 11021
516-482-4255

U-Tron, Inc. has announced a 12 MHz diskless LAN station.

The company reports that the UT1612 comes standard with 1M byte of memory. It can be configured with an Ethernet or Arcnet network card and either a Universal remote boot read-only memory or Novell programmable read-only memory.

Retail prices on the UT1612 start at $1,695 for an Arcnet version with monographics to $2,195 for an Ethernet, IBM Video Graphics Array system.

U-tron
243 Charcot Ave.
San Jose, Calif. 95131
408-943-1920

Compuadd Corp. has introduced a series of desktop personal computers that require 29% less desk space than previous models, the vendor said.

The product line comprises five systems, ranging from an entry-level $595 model to a $4,495, Intel Corp. 80386SX-based machine. All of the units reportedly include a dual hard drive interface, dual-disk drive controller, two serial ports and a parallel port. Each also provides three full-size and two half-size expansion slots. The products are available immediately.

Compuadd
12303 Technology Blvd.
Austin, Texas 78727
512-250-1489

Accel's *Macintosh-compatible 400 dot/in. handheld scanner*

Macintosh products

Accel Computer Corp. has introduced a pair of handheld scanners for Apple Computer, Inc. Macintosh computers.

According to the company, the Model 400A is a 400 dot/in. monochrome scanner with a scanning speed of 3.1 in./sec. and a scan width of 4.1 in. The Model 270A has a reported scanning speed of 1 in./sec. and per-color resolution of 4 bit/pixel. Both models are to be released in the fourth quarter of 1989. Accel has announced that pricing for the Models 400A and 270A will be below $500 and $800, respectively.

Accel
Von Karman Commerce Center
17145 Von Karman Ave.
Irvine, Calif. 92714
714-757-1212

Traveling Software, Inc. has announced a new version of its file transfer product for the Apple Computer, Inc. Macintosh system.

Traveling Software Laplink Mac Release III includes four types of Macintosh-to-Macintosh connectivity, the vendor said, including direct cable, phone modem, Appletalk and direct small computer systems interface connection capabilities. The product retails for $189.95.

Traveling Software
18702 N. Creek Pkwy.
Bothell, Wash. 98011
206-483-8088

Data storage

Algo, Inc. has announced Plotdisk II, a floppy disk drive intended to relieve workstations of plotting and printing duties.

According to the company, Plotdisk II permits a user to save a plot or print file to disk and then send that information directly to the printer via a built-in RS-232 port, allowing the workstation to be utilized for other applications.

Algo lists the price for a single Plotdisk II at $895.

Algo
1237 Queen Anne Ave.
Odenton, Md. 21113
301-672-1544

A rewritable optical-disc storage system has been introduced by American Digital Systems, Inc.

Called Masterdisk Optical, the product reportedly operates with all Digital Equipment Corp. Qbus-, Unibus-, 3100 series- and Bi-Bus-based systems. It contains up to 594M bytes of formatted data on a double-sided, 5¼-in. disk and offers a sustained data transfer rate of 925K byte/sec. The system comes with a two-year warranty on all parts and is available in three configurations. Pricing ranges from $57.95 to $74.95.

American Digital Systems
490 Boston Post Road
Sudbury, Mass. 01776
508-443-7711

Alloy Computer Products, Inc. has introduced a ¼-in., 60M-byte external tape backup system for IBM Personal Computers, XTs, ATs, Personal System/2s and compatibles.

The Retriever/60E is a QIC-40 standard, error-correcting tape system. An internal version is also available. The company reports the price to be $795.

Alloy
165 Forest St.
Marlboro, Mass. 01752
508-481-8500

Software applications packages

Adamation has announced an Ingres, Inc. Ingres-driven application for the Next, Inc. computer.

Christened Who's Calling, the software utilizes the Ingres relational database system to monitor phone calls and other key client information. It consists of five major components: a client database, a dialer, a tickler, a calendar and report-writing functions. It is priced at $495 per single user.

Adamation
1435 Oakland Center
Oakland, Calif. 94607
415-452-5252

Financial modeling software designed to assist executives and managers with data analysis and forecasting functions is available from Realworld Corp.

The Business Forecasting package utilizes a descriptive, nonprocedural English-like language, the vendor said, and includes What If, Goal Seek and Analyze capabilities. Models can be built that include variables, and different sets of data from multiple sources can be used.

The package runs in DOS and networked environments and is priced at $795.

Realworld
P.O. Box 2051
Concord, N.H. 03302
800-678-6336

Commontouch, Inc. has introduced a business letter-generator program that works without word processing, the company said.

Called Letterware, the software is especially suited for entry-level computer users and reportedly provides 144 fill-in business letters for credit, collections, orders, inquiries, bids, proposals and other correspondence.

It runs on IBM Personal Computers and compatible machines with PC- or MS-DOS 2.1 or higher and is priced at $79, plus $4.95 for shipping and handling. Massachusetts companies must add $3.95 sales tax.

Commontouch
P.O. Box 21
Newton, Mass. 02159
617-964-7740

NETWORKING

DATA STREAM

Elisabeth Horwitt

Could be a contendah

At first glance, DEC's Enterprise Management Architecture seems to have left the starting gate too late to have any chance at winning the integrated network management sweepstakes. A working version of the Decmcc Director is scheduled to ship late next year, or about a year and a half behind AT&T's Accumaster Integrator and several years behind IBM's Netview.

But bare shipment dates can be misleading. If you take a look at what is actually shipping, DEC starts to look like a viable contender. When you talk to some of the vendors and users who are trying to decide which system to support, DEC's chances look even stronger.

The two crucial elements of

Continued on page 49

Inside

- Third-party vendors relish DEC's EMA. Page 46.
- Laser transmission streaks through air. Page 47.
- Gazelle chip aimed at supercomputer communications. Page 48.

The new makeup at Mary Kay

Dallas cosmetics maker aims for systems consistency with DEC network

ON SITE

BY JOANIE M. WEXLER
CW STAFF

DALLAS — A corporate makeover under way at Mary Kay Cosmetics, Inc. might remove a few wrinkles from the brows of more than 300 decision makers demanding a common view of information.

To establish a consistent data architecture to provide that view, the 26-year-old company is replacing incompatible systems across the country with Digital Equipment Corp. computers networked over leased telephone lines using Decnet protocols. The linked sites include Mary Kay's corporate headquarters, factory and warehouse in Dallas and five branch distribution centers in California, Georgia, Illinois, New Jersey and Texas.

The company has hauled its 12-year-old Datapoint Corp. order-entry systems out to the curb and is preparing to pull the plug on its 6-year-old Wang VS processors when their leases are up in early 1991. DEC Microvaxes have replaced the order-entry systems, and word processing functions will be handled by MS-DOS-compatible personal computers linked through the VAX network.

A DEC 6330 host now operates alongside an IBM 4381 in the Dallas corporate headquarters, and the company plans to wean itself off the 4381 throughout 1990 and 1991, said Gary Bishop, vice-president of MIS.

About 170,000 independent beauty consultants throughout the country place orders for skin-care products and cosmetics through the company's five branch offices by mailing in an order form. The consultants serve as the primary source of information for the company in analyzing sales trends and demographics and pinpointing product problem areas.

"Gateways and bridges don't provide a common view across a complex network," Bishop said. "We're moving to a DEC VMS strategy that is based around the operating system software — not around the DEC hardware. We chose DEC because of its strength in networking."

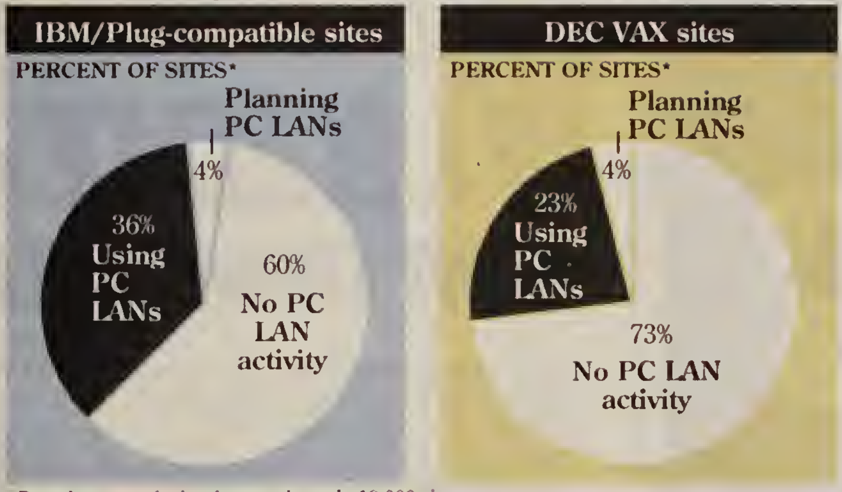
Larry Moore, director of operations at Mary Kay, added that "DEC gave us the ability to grow

Continued on page 48

Data View

LAN penetration

IBMers are more pro-LAN than those user sites with DEC VAXs installed



*Based on a analysis of approximately 19,000 sites

SOURCE: COMPUTER INTELLIGENCE

CW CHART: JOHN YORK

Bypass carrier seeks more local competition

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Metropolitan Fiber Systems, Inc. (MFS), a bypass carrier based near Chicago, recently launched a major regulatory initiative aimed at opening the local exchange market to more competition, particularly for high-volume business customers.

In essence, MFS wants to do in the local market what MCI Communications Corp. did in the long-distance market.

"It's time to open local telecommunications — the last frontier, the last monopoly in the United States," declared Anthony J. Pompliano Sr., president of MFS, at a crowded press conference.

If the divested Bell operating companies (BOC) faced more competition, users would benefit by lower prices and more innovative services, Pompliano said.

MFS launched its so-called Local Equal Access Initiative with two regulatory petitions:

- It asked the Federal Communications Commission to force the BOCs to give alternative carriers cost-effective interconnections and collocation of equipment in BOC central offices.
- It also asked the U.S. Department of Justice to require that the BOCs' local-access tariffs be unbundled so that alternative carriers can purchase only those local-service functions that they really need.

Pompliano claimed that, in both cases, the regulators would be enforcing policies already on the books. He said he anticipates a government response in the first quarter of 1990.

The agencies have supported local competition in the past, "so I think they would be fairly sym-

Continued on page 48

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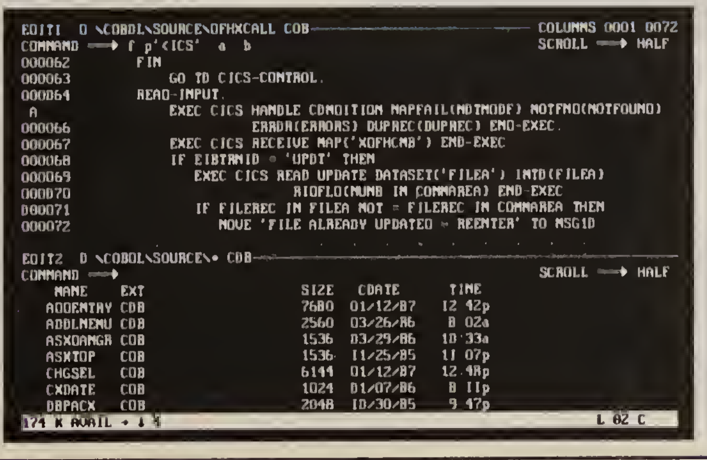

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000062       FIN
000063           GO TO CICS-CONTROL.
000064       READ-INPUT.
 A               EXEC CICS HANDLE CONDITION MAPFAIL(NOTMODF) NOTFND(NOTFOUND)
000066                     ERROR(ERRORS) DUPREC(DUPREC) END-EXEC.
000067           EXEC CICS RECEIVE MAP('XDFHCMB') END-EXEC
000068           IF EIBTRNID = 'UPDT' THEN
000069              EXEC CICS READ UPDATE DATASET('FILEA') INTO(FILEA)
000070                        RIDFLD(NUMB IN COMMAREA) END-EXEC
000071              IF FILEREC IN FILEA NOT = FILEREC IN COMMAREA THEN
000072                 MOVE 'FILE ALREADY UPDATED - REENTER' TO MSGID

EDIT2  D \COBOL\SOURCE\* COB-------------------------------------------------------
COMMAND ──→                                                     SCROLL ──→ HALF
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   ADDENTRY  COB                    7680  01/12/87  12 42p
   ADDLNEMU  COB                    2560  03/26/86   8 02a
   ASXDAMGR  COB                    1536  03/29/86  10 33a
   ASXTOP    COB                    1536  11/25/85  11 07p
   CHGSEL    COB                    6144  01/12/87  12 48p
   CXDATE    COB                    1024  01/07/86   8 11p
   DBPACX    COB                    2048  10/30/85   9 47p
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Third parties solidify release dates for DEC manager links

BY ELISABETH HORWITT
CW STAFF

Some of the more solid announcements that came out of Digital Equipment Corp.'s Enterprise Management Architecture (EMA) update two weeks ago were made by third-party vendors.

Four of the seven original EMA partners set release dates for links between their own products and Version 1.0 of DEC Management Control Center (Decmcc) Director, which is scheduled to ship in the third quarter of next year. The announcements included the following:

- Stratacom, Inc. will provide access modules to connect its IPX line of T1 multiplexers to Decmcc Director via the Open Systems Interconnect Common Management Information Protocol. Stratacom will also develop EMA-based applications to enable Decmcc Director to manage its IPX line of T1 multiplexers directly. Delivery of both products is scheduled for shortly after Decmcc Director ships. Stratacom will sell Decmcc Director as one of several management options. Stratacom and DEC recently announced an alliance for integrating DEC's LAN bridges with Stratacom's fast packet-switch technology.
- Vitalink Communications Corp. said it will write applications and links to allow Decmcc Director to manage its Translan local-area network bridges as well as communicate with Vitalink's wide-area network manager, Wanmanager. Vitalink's Decmcc connections will ship at the same time as Decmcc Director, it said.

Vitalink and Stratacom also announced a plan to develop an integrated, Decwindows, VAX-based platform that will provide troubleshooting and configuration management for users who want to feed LAN traffic through Vitalink's bridges onto an IPX multiplexer. The platform is scheduled to ship in early 1990.

- Codex Corp. said it will ship an access module to link its 9800 network management system to Decmcc Director on the date Decmcc Director ships. Codex said the 9800 will manage all Codex products, including multiplexers, T1 switches, packet switches and digital service units.
- TSB International, Inc. announced that it will deliver an access module for its Hub family of boxes, which collect alerts and performance data from a variety of private branch exchange systems. TSB also announced plans to implement the functionality of its Hub systems as applications within Decmcc Director.

Of the remaining three original EMA supporters, Timeplex, Inc. has yet to commit to writing any type of connection to DEC's platform. Meanwhile, DEC and Siemens AG are working out details of other communications-related alliances. Digital Communications Associates, Inc. committed to interfacing its network management system with DEC's, but it has set no definite time frame.

Six new EMA supporters made the following commitments:

- Infonet Services Corp. announced plans to adopt EMA as its "architecture for standards-based network management" for the firm's global packet-switched networking services, according to Infonet's President of Development and Operations, W.E. Perren. Decmcc Director will also manage portions of Infonet's recently announced private and hybrid network offerings, Perren said.
- Nynex Information Solutions Group agreed to develop management modules within Decmcc Director for its telemanagement system, which runs on DEC VAXs and IBM mainframes.
- Chipcom Corp. committed to developing a module to integrate its LAN backbone products with Decmcc Director.
- 3Com Corp. announced intentions to support peer-to-peer communications between Decmcc Director and applications designed under 3Com's new Open Management Architecture.

Such peer connection is one of the features that Charles Schwab & Co. wants in an integrated network management system, said staff telecommunications analyst John Payne. "Right now, when you manage a remote LAN you essentially have to log into the server, fiddle with the parameters and essentially act like a local terminal. This is probably not the best approach if you have 2,000 LANs."

Also agreeing to develop a Decmcc Director management module were telemanagement system vendor Telwatch, Inc. and the European division of T1 switch vendor Newbridge Network Corp.

Network manager aid released

Digital Equipment Corp. recently introduced a program for customers who would neither like to manage their networks nor have someone else do it all, but rather have something in between.

Netsupport Shared Services reportedly allows customers to use the same tools that DEC's Netsupport Services Program uses to manage customers' networks. Among them, which DEC has not yet provided commercially, are a network configuration manager and "a database to put in all the information about all the devices," said DEC spokesman David Lindsey.

The tools provided by Shared Services enable customers to take a more active role in managing their own networks, with or without the participation of DEC people, according to DEC.

DEC said the management tools provided through Shared Services will include support for Decmcc Management Station V1.0 as well as management of Transmission Control Protocol/Internet Protocol networks via the Simple Network Management Protocol.

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Local-area networks to put on laser light show

BY JOANIE M. WEXLER
CW STAFF

LAS VEGAS — Fiber optics — without the fiber — will soon have remote 4M bit/sec. Token-Ring networks communicating as the crow flies.

Laser beams will reportedly travel at channel speeds through the air across distances of up to one kilometer when the Lace L00-19 Token-Ring System, a LAN-to-LAN product announced at Comdex/Fall '89, starts shipping in January.

"The high throughput of laser technology is a major advantage," commented Patrick Springer, director of industry services consulting at Telecommunications Management Corp. in Needham Heights, Mass.

According to the vendor, the system reduces communications bottlenecks by connecting Token-Rings at their full 4M bit/sec. data rate. By contrast, bridges and switched local-area network linkages tend to provide throughput that is substantially slower than the actual speed of the LANs.

Springer added that the reliability of lasers is much greater than that of infrared waves, which are more distance-constrained and prone to being dissipated by fog or smoke. He also said that lasers, unlike terrestrial links, are not susceptible to cuts.

The $26,000 Lace system consists of two pairs of repeater-like units operating at the physical layer. At each network location, a front-end unit interfaces directly to the Token-Ring and connects via cable to a rooftop laser transceiver. The transceiver sends a 20-milliwatt gallium aluminum arsenide laser through the air to its mate at the receiving location, where the reverse process occurs.

Unrestricted

The vendor is targeting applications in campus environments, manufacturing complexes and downtown areas, where it can be difficult to get a license for microwave "because they often run out of frequencies," according to Michael Berman, director of marketing at Laser Communications.

Unlike microwave transmissions, lasers do not require Federal Communications Commission licensing. Berman said that the lack of a licensing requirement makes the laser system a viable choice for a disaster recovery system, because "you can have it up and running in a day."

Springer expressed concern over the safety and potential liability of the lasers, which he said can cause retinal damage in human eyes. Berman pointed out, though, that because laser beams require a line-of-sight path to communicate, the devices are generally mounted on rooftops or other places where it would be unlikely for humans to cross the beam.

Berman did concede that the one-kilometer transmission limit is more prohibitive than microwaves, which can travel up to several miles. He also noted that the laser system's biggest enemy is dense fog that would prohibit the rooftop transceivers from being able to "see" each other but said that his company has determined the average nationwide availability of the link to be 99%.

The company has similar laser repeater products for Ethernet and T1 networks, which were released in March. According to Berman, the company currently has 70 Ethernet installations in place.

Network access from Ameritech

BY ELLIS BOOKER
CW STAFF

ATLANTA — Ameritech Services, Inc. recently announced a network management system that reportedly gives customers access to the Ameritech network.

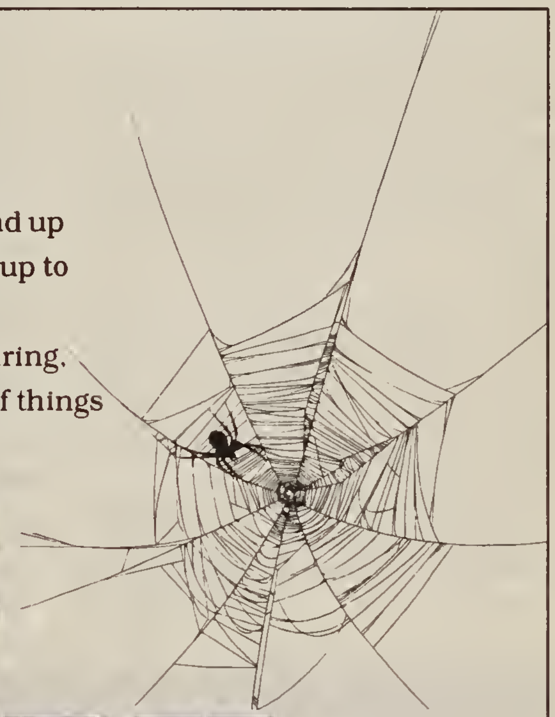
The Ameritech Service Management System was demonstrated at the Centrex Users Group Conference earlier this month.

The new service reportedly allows customers with a Digital Equipment Corp. VT100 terminal or personal computer to examine the configuration of their Ameritech communications services, check the service orders placed with the phone company, electronically send trouble reports to the phone company, test and monitor the performance of lines and even reconfigure the Centrex services.

Ameritech said the service will be available in the first quarter of next year from its five operating companies in Illinois, Indiana, Michigan, Ohio and Wisconsin.

Of potentially keen interest to those users with existing network management systems, Ameritech said it is working to provide interfaces between its service with other network management systems. Those interface requirements will be published next year, according to Ameritech.

While pricing details must await state-by-state filing of tariffs, an Ameritech spokesman said users will pay a start-up fee, a monthly subscription fee and a usage-sensitive charge.



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Bypass

CONTINUED FROM PAGE 45

pathetic to these types of claims," said Stuart N. Brotman, a communications industry consultant in Lexington, Mass.

Business users will support the initiative because they want route diversity "and they also want to put some leverage on the BOC," commented Joseph S. Kraemer, national director of the telecommunications industry consulting practice at Deloitte & Touche in Washington, D.C.

"The users and the interexchange carriers really want [local competition] to happen, so you've got two fairly strong forces in the regulatory arena that are going to be in favor of as much alternative access as possible," Kraemer said.

But the MFS proposal is likely to be fought tooth and nail by the regional Bell holding companies. Bell South Corp., for example, issued a statement that called the MFS initiative a "cream-skimming proposal, designed to benefit only high-volume users of specialized business services."

"Their [MFS] initiative is curious. They're already competing vigorously in the local exchange marketplace in a number of locations, including the Chicago area," said Steve Ford, a spokesman for Ameritech in Chicago.

The regional Bell holding companies have argued that allowing competitors to put equipment in their facilities would be an administrative, space and security problem. In a separate proceeding concerning Open Network Architecture, the FCC sided with the regional Bell holding companies and refused to mandate collocation.

One user downplayed the significance of the MFS proposal. "Metropolitan Fiber is barking up the right tree in terms of supporting competition . . . but they're a niche player right now, and they'll continue to be," commented Richard A. Fazzone, telecommunications affairs manager for General Electric Information Services, a Rockville, Md.-based unit of General Electric Corp.

According to Fazzone, bypass carriers are niche players because they can serve only a small fraction of a large user's network requirements, compared with the ubiquitous local-access networks of the BOCs.

In its petitions, MFS said its share of the business market could grow if regulators gave alternative carriers equal access to BOCs' central offices. The BOCs' bundled tariffs and high interconnection fees make it too expensive for MFS to provide service to user sites located off the MFS network, the MFS petitions charged.

MFS has installed its fiber-optic networks in several major cities, including Baltimore, Boston, Chicago, Houston, Los Angeles, Minneapolis, Philadelphia and San Francisco.

Kraemer said he expects that by the end of 1992, there will be at least one alternative carrier in two-thirds of the top 75 U.S. cities.

Gazelle leaps ahead with chip

BY JOANIE M. WEXLER
CW STAFF

Beefed-up efficiencies in distributed computing environments will likely be one bottom-line benefit of a Gazelle Microcircuits, Inc. gallium arsenide chip set, which reportedly will let a new generation of supercomputers communicate with one another as fast as they can process data.

"There's no point in having a parallel processing setup if you can't transfer data fast enough to use the processing speeds," explained Jon Zierk, Gazelle's product marketing engineer.

Supercomputers using the high-speed pair of integrated circuits should be announced during the second quarter of next year, according to Zierk.

Gazelle's Hot Rod transmitter and receiver pair functions as a multiplexer/demultiplexer that converts 40 bits of parallel data to a 1G bit/sec. serial bit stream in the sending computer, then demultiplexes the serial stream back into parallel data in the receiving computer.

Gallium arsenide is an attractive alternative to silicon for integrated circuits because of speeds of at least five times faster and low power consumption, said E. Lawrence Hickey, a consultant at First Analysis Corp. in Chicago.

Countering volt jolt

One reason gallium arsenide has not been widely adopted, according to Hickey, is that it runs on a different voltage than silicon, which can make interaction with silicon components cumbersome.

Zierk said, "Our strategy is 'slow' gallium arsenide. On many of our products, our chips don't run faster than two times the silicon rate, so they'll interact comfortably with the silicon components."

According to Zierk, workstations operating at 30 millions of instructions per second on a 32-bit bus are effectively using 960M bit/sec. of data. The fastest silicon solution at the moment is only 100M bit/sec.

Mary Kay

CONTINUED FROM PAGE 45

with operating system upgrades rather than with total conversions. The new levels in IBM would tend to require complete conversions, where the DEC equipment is all upward-compatible."

Moore added, however, that the company will have to give up some IBM-world efficiencies for that convenience. "As the VMS operating system continually gets larger, it eats up more memory," he said. "So there's a trade-off in benefits."

Bishop noted that the pressing need to establish a cohesive wide-area network came at a fortuitous time, because most of Mary Kay's computer equipment, which spanned five operating systems, needed to be replaced or upgraded anyway.

"The old systems had really lived full lives, and we had the luxury to be able to start over," he said. "Aside from the incompatible systems no longer being able to support our business objectives, maintaining so many different computers created a lot of redundant costs."

Data on sales transactions and personal information about the beauty consultants are integral to Mary Kay's personalized reward-and-recognition corporate culture, according to Bishop. He explained, for example, that individual sales records help determine when consultants have earned special incentives such as a renowned pink Cadillac.

Bishop said a major business need in the company is to speed up the order-fulfillment cycle. He said he is looking forward to availability of automatic number identification, an Integrated Services Digital Network (ISDN) feature, in his region.

ANI allows the automatic display of caller information on a computer screen and speeds up customer service by eliminating time spent taking personal information over the phone and accessing customer files.

Bishop noted that while ISDN is available from his local-exchange carrier, the ANI feature is not. Other technologies he is exploring to step up filling of orders are optical scanning of order forms and videotext.

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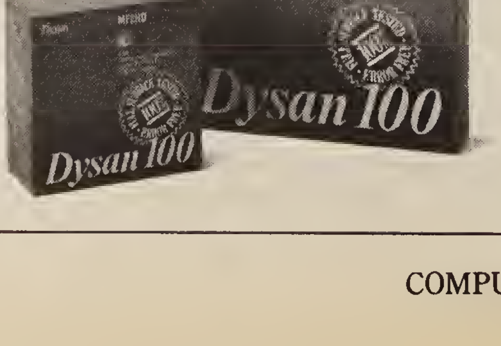

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Horwitt

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an integrated network management platform are the following: setting up communications between the platform and other vendors' devices or network management systems; and implementing the applications to manage those systems.

Both IBM and AT&T have provided third-party connections to their platforms, but no one seems particularly excited about the links so far.

IBM's Netview/PC is the interface that users and vendors love to hate. It's expensive to use a personal computer as your liaison to Netview, and two-way communications appear to be technically possible but kludgy. Networking companies, as well as big users such as Sears and American Express, are bypassing Netview/PC by developing direct links to Netview.

AT&T, like IBM, provides a two-way connection between its network management platform and its own products. Other vendors, however, currently have to make do with a primitive one-way link for sending alerts up to Accumaster Integrator.

AT&T has promised to provide full-function, two-way links to other vendors' systems, based on Open Systems Interconnect protocols such as Common Management Information Protocol by late 1990 or early 1991. IBM now offers OSI Communications Subsystem, which provides an OSI connection to Netview.

> AT&T IS SAID TO be developing network management functions that will work across various systems, but one vendor complained that it does not want to be told by AT&T how to manage its own products.

Unfortunately, it only supports Manufacturing Automation Protocol 3.0 so far, not the OSI standards currently being finalized by ISO, and reportedly it is both clumsy and expensive. IBM has promised to provide OSI commands as a native part of Netview at some unspecified date (but don't hold your breath).

While multivendor party connectivity is an important element of an integrated management platform, applications to manage that third-party equipment are both more crucial and much more difficult to provide. Part of the problem is that leading vendors don't like giving their rivals access to the inner workings of the network management software.

IBM reportedly has refused to cooperate with vendors that want to implement their own management applications under Netview; also, Netview development tools are said to be ponderous at best.

AT&T is said to be developing network management functions that will work across various systems, but one vendor complained that it does not want to be told by AT&T how to manage its own products.

The path for DEC's belated entry into the integrated management market has therefore been made smoother by the fact that neither of its chief rivals has yet provided a satisfactory solution, a slew of announcements to the contrary.

Decmcc Director won't hit the streets for another year, but when it does it will almost certainly offer full OSI compatibility as well as an object-oriented network management information repository that neither IBM nor AT&T has announced yet.

And DEC has already provided something ahead of its rivals: software tools and specifications for adding both equipment and management applications to the platform as needed.

Early EMA supporters, who have had their hands on DEC's systems reference manual for some time, praised DEC for spelling out how to develop not only full-function connections to Decmcc Director, but also management applications that, once plugged in, can be used to manage any relevant piece of equipment that is hooked into DEC's system.

As one third-party spokesman said, it would be technically possible to write the modules needed to turn Decmcc Director into an IBM-only management system. As a DEC spokeswoman said, DEC is counting on its own management products' superiority, since it is making the technical core of its management system available for a $200 license fee.

If this is true, a round of applause for DEC.

The one vendor I've left out of this equation is Hewlett-Packard. No one seems to have a bad word to say about Openview: they believe HP when it says it will provide OSI compatibility; they praise the openness of the tool kit and user interface; they look forward to HP's incorporating its strong set of LAN management tools into the multivendor system.

However, I don't hear a lot about Openview making the short list among companies choosing integrated management platforms. Nor have I heard much lately about Openview's progress from an HP-only management system to a multivendor system. So, what's going on, HP?

Horwitt is a *Computerworld* senior editor, networking.

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NEW PRODUCTS

Local-area networking hardware

C. Itoh Electronics, Inc. has entered the Ethernet local-area networking marketplace with the announcement of two Ethernet graphics terminals — the monochrome CIT334ET and color CIT344ET — that allow connection to both LAT and Transmission Control Protocol/Internet Protocol-based networks.

Both devices were designed to expand the company's Tiger line of Digital Equipment Corp.-compatible terminals.

Single-unit prices, including the Ethernet option, are $2,495 for the CIT334ET, and $3,495 for the CIT344ET.

C. Itoh Electronics
2505 McCabe Way
Irvine, Calif. 92714
800-347-2484

Front ends, multiplexers

Advanced Computer Communications has enhanced the ACP 5250, a Q-bus resident X.25 controller that operates as a front end for the Ultrix-based reduced instruction set computing environment of Digital Equipment Corp.'s Decsystem 5400.

According to the company, the ACP 5250 provides a wide-area networking interface directly integrated with the Ultrix Transmission Control Protocol/Internet Protocol networking kernel, thereby permitting remote applications.

Decsystem 5400 configurations are priced at $4,400, and a multiprotocol device driver option is available for $900, the company said.

Advanced Computer
Communications
720 Santa Barbara St.
Santa Clara, Calif. 93101
805-963-9431

Local-area networking software

Pernetix, Inc. has announced its line of software products designed to integrate DOS and Unix networks.

The Pernetix system enables DOS users to access Unix files and printers by using DOS commands and Unix users to access DOS via Unix commands, the company said. The product line reportedly includes an IBM-compatible DOS file/print server that runs on Unix systems, interconnect products for dissimilar networks and Netbios programming interfaces for DOS and Unix systems.

Pricing for the product line ranges from $595 to $3,995.

Pernetix
13633 Gamma Road
Dallas, Texas 75244
214-385-2376

Santa Cruz Operation, Inc. has announced the JSB Multiview Desktop user interface, a graphical windowing system for networked DOS, Xenix and Unix systems.

The product was designed for MS-DOS users who want to share data and files with SCO Xenix and SCO Unix systems on a network. It is said to allow users to connect any Intel Corp. 80286- and 80386-based personal computer running Microsoft Corp. Windows to an SCO Unix or SCO Xenix host via an RS-232 connection or a local-area network.

A single-user license costs $149. Five- and 10-user licenses are available and are priced at $495 and $795, respectively.

SCO
P.O. Box 1900
Santa Cruz, Calif. 95061
408-425-7222

D.L. Hiller and Associates, Inc. has enhanced its Factory Data Manager software package to include support for up to eight communications ports per controller.

The software reportedly operates on both local-area and bar-code networks and provides artificial intelligence resource tracking of factory labor, machines and material.

The latest release also allows each LAN user to create his own real-time monitoring windows. Version 4.0 users may obtain an upgrade for $100.

D.L. Hiller
14536 Island Drive
Sterling Heights, Mich. 48078
313-247-0394

Links

Mitek Systems Corp. has announced two networking products to provide greater distributed processing power between IBM Systems Network Architecture Networks and Transmission Control Protocol/Internet Protocol networks.

The Openconnect/FTP Server for VM resides on IBM VM systems and reportedly permits TCP/IP users to access the SNA VM host from their TCP/IP terminals. Features include bidirectional transfer of binary and ASCII source files, password checking and directory viewing. The server is priced at $5,450.

The product uses the standard mail transfer protocol for TCP/IP, according to the firm.

It is available as a combination hardware and software product on an IBM Personal Computer AT, or as software only for customers who have an available AT machine on the network. The complete package costs $10,000 and includes the PC, required software and an Ethernet card. The software-only version is priced at $3,000.

Mitek Systems
2033 Chennault Drive
Carrollton, Texas 75006
214-490-4090

Simpact Associates, Inc. has introduced software that allows a Digital Equipment Corp. Microvax computer to serve as the basis for a data broadcast network.

The Q17000 Data Broadcast Switch (DBS) Software reportedly allows 20 to 3,000 user terminals on a network to send large data files to many destinations. The product comprises a DEC Microvax computer, DBS software and up to eight proprietary Intelligent Communications Processor boards.

A license for the stand-alone version of the DBS software is $10,000. The multinode version costs $15,000 per DBS.

Simpact Associates
9210 Sky Park Court
San Diego, Calif. 92123
619-565-1865

Farallon Computing, Inc. has introduced the Portable Pack, a set of hardware and software tools for connecting the Apple Computer, Inc. Macintosh portable to remote Appletalk local-area networks.

The product reportedly allows modem-equipped Macintosh Portables to operate and exchange files with their office machine from any telephone. The tools also permit high-speed file transfer between the portable and other office machines.

Portable Pack carries a suggested retail price of $495.

Farallon Computing
2150 Kittredge St.
Berkeley, Calif. 94704
415-841-5770

AT&T has announced two offerings aimed at the facsimile marketplace: a set of international messaging functions, dubbed the AT&T Enhanced Fax, and the 9015PF, a two-line machine for simultaneous voice and facimile transmission.

Enhanced Fax reportedly features store-and-forward calling, automated broadcast capability and a personal mailbox function. It is priced on a per-page basis, with U.S. messaging available at 60 cents per page. The 9015PF provides several telephone functions, and the suggested retail price is $1,595.

AT&T
National Product Center
1 Speedwell Ave.
Morristown, N.J. 07960
800-624-5672

Applitek Corp. has announced that it has added Transmission Control Protocol/Internet Protocol to its line of internetworking products.

Its TCP/IP offerings support all three primary classes of IP addressing (A, B and C) and include two terminal servers, an IP router, an interchannel/intermedia bridge and a centralized data management and control system, the vendor said.

Prices range from $2,395 for the terminal server to $25,000 for the network performance monitoring software.

Applitek
107 Audubon Road
Wakefield, Mass. 01880
617-246-4500

Modems/multiplexers

General Datacomm, Inc. has added four members to its dial-up modem family that reportedly feature five-speed capability, multiple dialing options and compliance with a range of Bell and CCITT standards.

The Datacomm 596 and V.32E models are designed for high-density, central-site installations, the vendor said. Desktop 596 and V.32E are said to be compact, stand-alone versions of their Datacomm counterparts.

According to the company, the 596 models serve the North American user, and the V.32E models support international operation.

The Datacomm models are each priced at $1,395; desktop versions sell for $1,075.

General Datacomm
1579 Straits Turnpike
Middlebury, Conn. 06762
203-574-1118

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Case/Datatel, Inc. has announced a modem control unit that provides on-line Netview management as well as control of the company's line of DCM4000 diagnostic modems.

The NVI4160 uses the LPDA 2 network management protocol to communicate with the host system, the firm said, and no user programming is required. The IBM mainframe operator can change configuration parameters, perform tests and monitor status. Modem-generated diagnostic information is sent to the host in the appropriate format when requested by Netview.

The product is priced from $2,195.

Case/Datatel
7200 Riverwood Drive
Columbia, Md. 21046
800-227-3134

Network Interface Corp. has expanded its hub series of products with the announcement of intelligent diagnostic hubs designed to prevent network failure.

The hubs may be intermixed with all existing Arcnet-compatible hubs and are available in coaxial cable, twisted-pair and fiber-optic topologies. No additional cabling is required. They include intelligent interface software and are reportedly capable of disconnecting a problem-causing node and protecting the network from duplicate node identifications.

In a standard eight-port configuration, the product is priced at $725 for a coaxial cable version and at $895 for a twisted-pair version. Fiber optics require a custom configuration, and pricing will vary.

Network Interface
15019 W. 95th St.
Lenexa, Kan. 66215
913-894-2277

Electronic data interchange

ACS Network Systems has announced Release 4.0 of its EDI/38 and Application System/400 software.

The latest release supports the Electronic Data Interchange for Administration, Commerce and Trade (EDIFACT) and the EDIFACT/Odette international standards for electronic data interchange transmissions.

The product allows ANSI documents to be wrapped in an EDIFACT envelope and vice versa, the vendor said, and all elements within an envelope are easily definable.

Pricing starts at $9,000 for IBM System/38 users and $7,000 for users of IBM's AS/400 computers.

ACS Network Systems
Suite 1200
1485 Enea Court
Concord, Calif. 94520
415-827-3820

Stratus Computer, Inc. in Marlboro, Mass., and EDI Solutions, Inc., based in Minneapolis, have announced a marketing agreement that will make EDI's Editran software available on the Stratus XA 2000 Continuous Processing System.

The partnership was formed to target emerging markets for electronic data interchange systems in retail, distribution and manufacturing industries. Pricing will vary according to individual integration project.

Stratus Computer
55 Fairbanks Blvd.
Marlboro, Mass. 01752
508-460-2000

Micro-to-host

Emerald Technologies, Inc. has announced a combination hardware and software product designed to provide Intel Corp. 80286- and 80386-based workstation users running AT&T Unix with IBM midrange terminal emulation and file transfer capabilities

Handshake-Alliance consists of an adapter card and workstation and host-based software. Pricing ranges from $2,495 to $3,445.

Emerald Technologies
Suite 103
18912 N. Creek Pkwy.
Bothell, Wash. 98011
206-485-8200

Network Software Associates, Inc. has announced a mainframe-like print spooling software package that runs in conjunction with the company's AdaptSNA family of micro-to-host links for IBM Personal Computers and compatibles.

AdaptSNA Printspool was designed for applications that require remote printing of large files that have been downloaded from a mainframe, the vendor said. The connection can be used with a variety of configurations, including a remote Synchronous Data Link Control link or a Netbios local-area network gateway. The package is priced at $95.

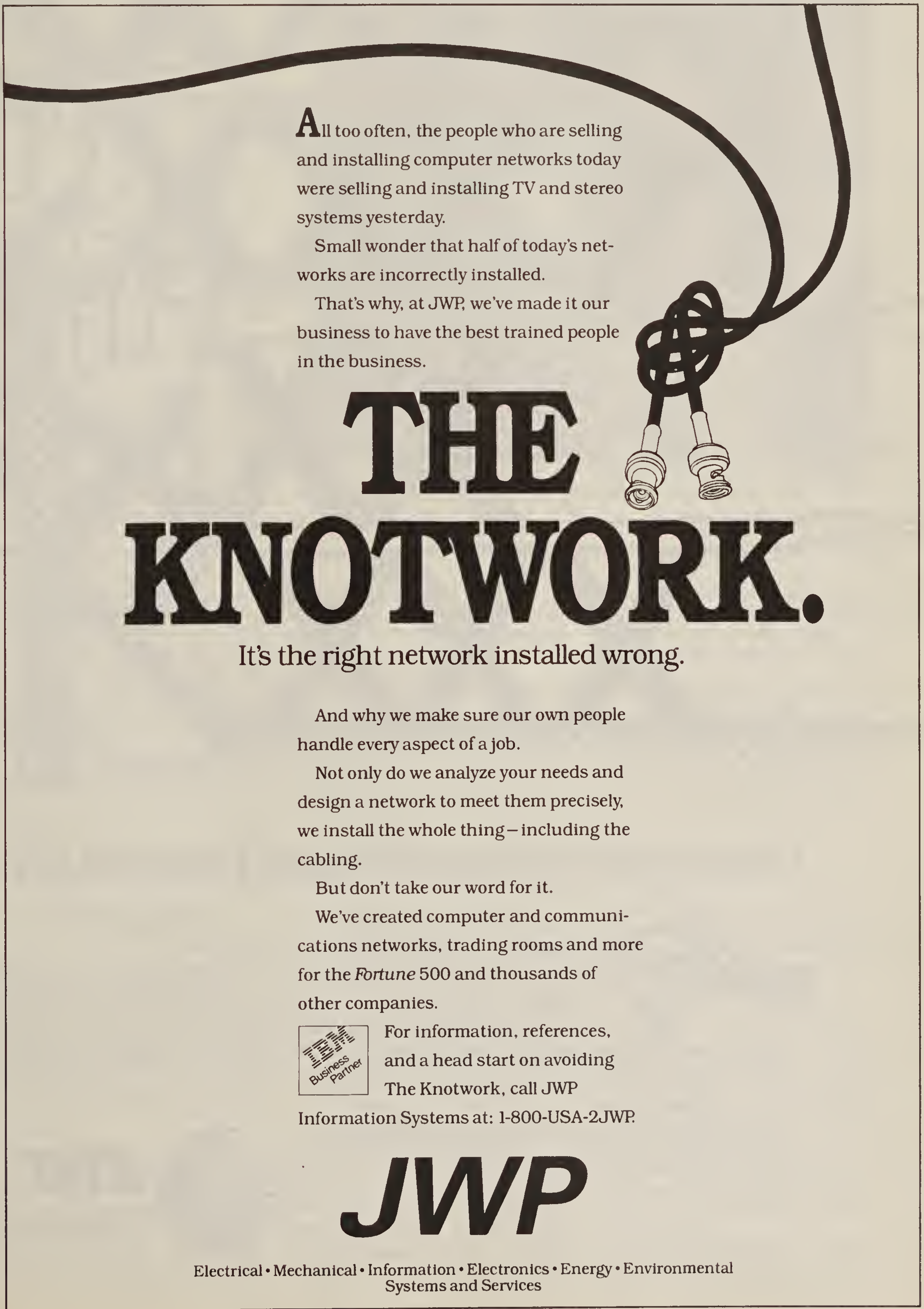
NSA
39 Argonaut
Laguna Hills, Calif. 92656
714-768-4013

Host-to-host

Unisys Corp. has announced OSI Transport Services, communications and networking software designed for its DCP line of communications processors.

The product was developed to support common Open Systems Interconnect (OSI) application services on the company's 1100/2200 series systems in host-to-host implementations. The Unisys DCP OSI Transport Services product is available under a five-year license for $9,900.

Unisys
P.O. Box 500
Blue Bell, Pa. 19424
215-542-5367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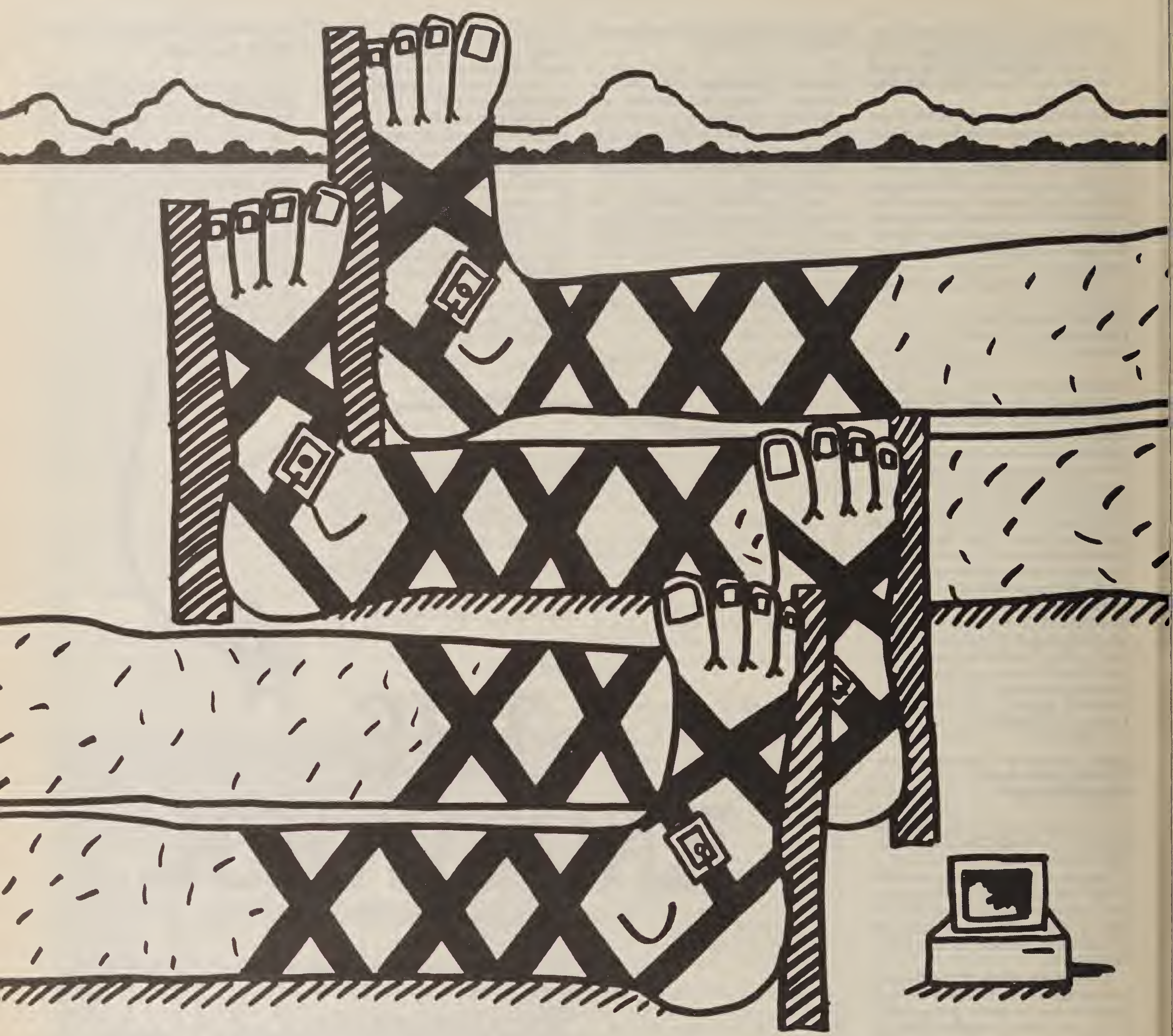

How one AT&T Networked Computer managed to topple 2 giants.

InfoWorld, a leading PC journal, just rated AT&T's 6386/25 WGS superior to the IBM® PS/2® Model 70-A21 and Compaq® Deskpro 386/25 in an overall test of performance, ease of use, serviceability, and value, among other things.

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EXECUTIVE TRACK

Ed Severs has been appointed MIS director at the **International Association of Hewlett-Packard Computer Users,** known as Interex, in Sunnyvale, Calif. Interex is a 15-year-old user group with over 10,000 members.

Before joining Interex, Severs was MIS director at Versatec for six years, where he was responsible for all information systems and communications functions. He was previously director of finance and administration at Datapoint Corp., where he managed the MIS department and finance department. Severs holds undergraduate degrees in economics and computer science and an MBA from Golden Gate University.

……

Terrie Gulden has been named president of the new IS unit of **W.R. Berkley Corp.,** an insurance holding company in Greenwich, Conn. The unit, Berkley Information Services, Inc. (BIS), is based in Luverne, Minn. BIS provides software development and computer services to Berkley's subsidiaries.

Gulden was previously senior vice-president of data processing at Tri-State Insurance Company of Minnesota, a Berkley subsidiary.

Other newly elected officers of BIS are **Jack Bennett,** vice-president of systems design and development; **Dwight Bremer,** vice-president of Micro Systems Division; and **Gary Oehlerts,** vice-president of applications development.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Delivering data to the deal makers

Warner's Winski has the communication tools for life in the entertainment fast lane

BY CLINTON WILDER
CW STAFF

PROFILE: Don Winski

ANDY FREEBERG

Position: *Executive director of corporate information services, Warner Communications, Inc.*

Mission: *Providing central IS and telecommunications policy leadership for a decentralized organization*

It has been the year of *Batman*, the Rolling Stones tour and the blockbuster $13 billion merger of Warner Communications, Inc. with Time, Inc. More than ever, the entertainment industry is driven by big hits, big bucks and big deals.

As with any business, information systems play an increasingly important role in the fast-moving world of movie moguls and millionaire rock musicians. But Don Winski, executive director of corporate information services at Warner Communications, knows that strategic systems are sometimes no substitute for power lunches or conference calls on cellular car phones.

"Information is not just what's on a computer screen or on paper," Winski says. "Voice is information and is usually more important in closing a deal than classic hard data. It's hard to predict when a deal will click, but we [in IS] have to be ready."

Winski's personal accessibility is evident in his strong handshake, hearty laugh and the pile of comic books on his office coffee table. His speech flows quickly with a slight tinge of his Brooklyn birthplace, a style that he likes to call "a New York corporate accent."

Originally trained as a chemical engineer, Winski moved into operations research and has had a varied computer technology career with stints as a consultant, entrepreneur and IS executive. He and those who know him agree that his broad business background is essential for success in the entertainment industry's fast lane, particularly in a culture led by deal-making Steven Ross, Warner's chairman.

"It's a tough, take-no-prisoners business," says Jerry Mayfield, a principal at the DMW Group, a telecommunications consultancy that has worked closely with Warner. "Most guys would last about 15 microseconds in a job like that unless they can communicate at the business level."

Mayfield describes Winski as "forceful but subtle" in working with Warner's diverse business cultures, which range from the blue jeans of acquired small record companies to the tailored suits of buyout financiers. "It was like hand-to-hand combat getting some business units onto the corporate network," Mayfield says. "Don was like an orchestra conductor bringing order to it."

At Warner, Winski forcefully advocates centralized network management and equipment purchasing for significant vendor discounts but is equally insistent on decentralized IS

Continued on page 56

High-tech firms: Do as they say, not . . .

BY ALAN J. RYAN
CW STAFF

There are certain things people take for granted: the price of roses and the use of high technology. The price of roses will double around Valentine's Day, they believe, and high-technology companies are probably the most effective users of information technology.

Wrong.

Flower prices aside, a recent study by Andersen Consulting found that while New England high-tech companies rated customer information as the most important aspect of running their companies, a majority of them rated their current customer information systems as operating at below average to average.

The survey focused on four areas: strategic business planning, executive reporting, IS effectiveness and systems development success. And although 97% of respondents perform strategic business planning as frequently as every year, only 11% believe the process is effective. In fact, two in 10 said it is not at all effective.

Few engage in IS planning

The survey of more than 350 CEOs and top executives at high-tech companies in New England also found that fewer than half of the companies engage in IS planning as part of their overall strategic business planning process.

The top executives also said they want IS personnel to perform more effectively, particularly in understanding systems implications of the companies' business plans, and in planning and completing systems projects on time and within budget.

The companies polled have revenues ranging from $10 million to more than $1 billion. Of those, 47% of the companies with medium or high growth rates were found to have an executive reporting system specifically tailored for top management.

That figure potentially indicates that high-growth companies gain competitive advantage through timely access to strategic information found in such systems.

Overall, only 31% of the companies surveyed had any executive reporting system that provides information characterized as unique and focused.

TAKING CHARGE

Les Gilliam

How to survive techno-shock

Joe Hurry, the MIS manager at the Daylight Beverage and Loan Co., is on his second cup of coffee and is trying to finish the budget justification report due today. Suzy the secretary walks by his desk, leaving a note from his boss, Microbrain Johnson. The boss has just read in his latest issue of *PWS-Week* that Jimmy the Guru says a repository is the key to a successful computer-aided software engineering strategy. So the boss wants to know if they have a repository, and why they need a strategy for their cases.

Not being exactly sure what a repository is, Joe quickly grabs his well-worn copy of ol' Noah's *New World Dictionary*. Noah says that a repository is "a box, chest, closet or room in which things may be placed for safekeeping; a burial vault or sepulcher."

Not having an electronic mail system, Joe sends a hand-written note to the boss stating that all the nightly backup tapes are taken daily to the vault at the Last National Bank. In regard to strategy, Joe states that the new inventory control system will keep track of their beverage cases and it is expected that significant cost reductions will be achieved. But deep down, Joe suspects the Guru isn't talking about vaults and beverage storage and wonders how he will be able to stay up to date on all the new ideas and products hitting him from all sides.

HOW CAN THE IS manager hope to stay abreast of new developments, while meeting current work load commitments?

He wanted to initiate a project to study the feasibility of an executive information system and a tape robot for the computer room, but the budget squeeze put a stop to those ideas. He is still on the spot to prove the value of the local-area network he was allowed to install.

Joe is encountering the technology introduction shock that faces many throughout the information technology community. The press is having a heyday writing about all the new concepts and scenarios, underwhelming us with client/server architectures, entity relationships, interenterprise systems and object management. Seminars on a myriad of new subjects abound.

There are probably countless IS managers who are developing an inferiority complex. Not only have they not implemented all these new ideas, but many do not even understand the terminology.

We are being told that the rate of change in technology is increasing. Some have said we should expect as much technology change in the next five years as we have seen during the previous 10. If so, how can the IS manager hope to stay abreast of new developments, while meeting current work load commitments?

The two primary keys to survival are time management and discernment.

The IS manager's time should be allocated to three areas — current projects, quality improvement and future technology. The highest priority, of course, is to meet the current IS needs of the business and carry out the commitments already made. This includes the necessary planning, budgeting and management time to succeed with the technology being used now.

Next, the IS manager must continually evaluate the quality of people and resources being applied to the needs of the business. If the quality is not adequate, the use of new technology may be a mistake. In other words, advanced technology applied to a mess will only make it worse. Time must be allocated to quality improvement to prepare to take advantage of new technology.

In most cases there is such a demand on the IS manager's time that it is easy to let the study of new technology be pushed aside. The solution here is to set aside a certain time each day or week to devote exclusively to reading, research or planning. In addition, seminars and conferences should be a part of every manager's annual schedule and budget.

The IS manager should be selective as to which technology subjects receive more than a perusal. Sound judgment is needed to decide which new ideas and products are worthy of sizable amounts of time, attention and funds. This should be limited to only those that offer potential value to the IS manager's company.

Lastly, some managers are successful in delegating the task of keeping up to date with new technology developments. Care should be taken, however, to keep upward communications active, so the manager can maintain a general knowledge of the applicable topics and be able to properly delegate the details.

Gilliam is president of Gilliam Associates, a computer management consulting firm based in Ponca City, Okla.

Two mainframes. They work together, but one needs 50% more people to run. Which do you buy?

*Overall average for systems and sites surveyed, 1988 independent survey of over 600 user sites.
**1988 Datapro Research; Mainframe Users Survey.
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BOOK REVIEW

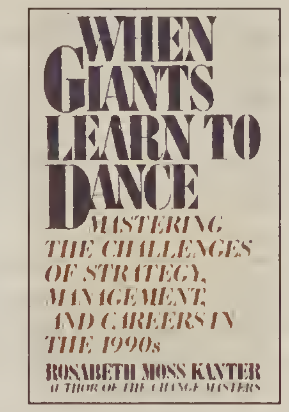
Helping executives keep on their management toes

WHEN GIANTS LEARN TO DANCE
By Rosabeth Moss Kanter
Simon and Schuster, $21.95

While plenty of self-styled business gurus straddle the academic and consulting worlds, Rosabeth Moss Kanter stands out from that crowd in her ability to mesh hard research numbers and corporate case studies into useful, highly readable business strategy.

When Giants Learn to Dance takes a fresh look at the wave of change that has overwhelmed most traditional U.S. companies — "corpocracies," as Kanter calls them. *Giants* is a must-read for nervous managers who are looking for advice on how to cope with that wave, or better still, take competitive advantage of it.

For over a decade, Kanter has used her passport into dozens of major corporations to put together a picture of how U.S. corporations are coping with an increasingly volatile, complex and globally competitive market.


WHEN GIANTS LEARN TO DANCE
MASTERING THE CHALLENGES OF STRATEGY, MANAGEMENT, AND CAREERS IN THE 1990s
ROSABETH MOSS KANTER
AUTHOR OF THE CHANGE MASTERS

Giants is the fruit of Kanter's close observations of 25 large corporations, which she began just after her best-selling *Change Masters* was published in 1983. The new work's central message is that innovation and competition have accelerated to such a pitch that the old-style corpocracies must in effect learn to be more flexible and innovation-oriented — to dance rather than lumber — lest they become next year's dinosaurs.

The meat of the book is Kanter's recommendations on how businesses can learn "post-entrepreneurial" skills with the most gain and least pain. Far from recommending that corporations take on the rough-and-ready style of start-ups, her success formula blends the discipline and cooperativeness of a corpocracy with the flexibility and responsiveness of an entrepreneurial firm.

In her style of teaching by example, Kanter tells how two companies at opposite ends of the spectrum regained their competitive equilibrium: Apple Computer, Inc. by tempering its feisty entrepreneurial spirit with corporate business sense and Eastman Kodak Co. by leavening its ponderous bureaucracy with innovative practices.

In laying out general guidelines for achieving the post-entrepreneurial state, Kanter makes a strong pitch for what she calls "becoming PALs:" pooling, allying and linking resources across different divisions, subsidiaries and businesses.

Kanter does not limit herself to suggesting general strategy, however. She goes on to provide tactics for reaching those aims, as well as caveats on the potential problems and side effects of going post-entrepreneurial.

In the chapter entitled "Desperately Seeking Synergies," for instance, she points out how the restructuring that results from cutbacks, downsizing and acquisitions frequently levies high human costs such as the loss of motivation, trust and key personnel.

Kanter describes how management has fought the worst effects of restructuring with methods that range from the obvious to the bizarre. On the bizarre side, one firm staged a mock funeral for its newly acquired subsidiary in which managers ceremonially crumpled up their business cards and letterheads and tossed them into a coffin.

Perhaps the weakest part of *Giants* is the section in which Kanter examines how the new entrepreneurial business climate is affecting how individuals view their jobs. She points to problems such as work overload and work-family time conflict, but her solutions are often vague and unoriginal, such as the concept of management "making it legitimate for both men and women to participate actively in family life and adding to their fringe benefits the resources to do this effectively."

More valuable is Kanter's portrayal of how job security is being replaced by "employability security" in the post-entrepreneurial world.

With job-hopping on the rise, savvy management must recognize employees' need to acquire new skills and to be motivated more by a desire to turn in a good performance than by the hope of securing a well-paid, permanent home in a corporation.

Kanter's style remains lively throughout, although she sometimes goes too far with her penchant for analogies. For example, she coins the useful phrase "newstreams" for projects and organizations dedicated to innovation and then drowns the reader in a deluge of word plays.

Minor beefs aside, Kanter is a top-notch story teller who gives the reader that exhilarating sense of being an insider in corporate strategy sessions — and of learning from the big players' mistakes.

However, unlike some of her colleagues, she does not confine herself to observing pending catastrophe and leaving the reader to figure out how to cope.

ELISABETH HORWITT

Horwitt is a *Computerworld* senior editor, networking.

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Deal makers

FROM PAGE 53

decision making at the business unit level.

"Corporate headquarters does not have a monopoly on intelligence," he says. He defers explaining any innovative or strategic IS projects in Warner's business units, saying, "I don't want to steal their thunder."

From his corporate office in New York's Rockefeller Center, Winski feels he has the necessary overview of Warner's computer and communications infrastructure to suggest synergies and strategic opportunities. "We try to be a catalyst and a facilitator but not take control," he says. "That can be hard for people from a traditional data center mentality."

Winski's mentality is anything but that, and his resume reveals why. Armed with a master's degree and doctoral work in operations research at Brooklyn Polytechnic University, he joined Price Waterhouse as an electronic data processing consultant. His IS career continued at Royal Dutch Shell and Ingersoll-Rand Co., but he says, "In my heart, I'm always a user."

> "CORPORATE headquarters does not have a monopoly on intelligence."
>
> DON WINSKI
> WARNER

After heading MIS strategic planning at Ingersoll-Rand for two years, he joined and later became chief executive officer of a cellular telephone services business owned by Bell Atlantic Corp. He joined Warner in his present position in 1986 "by sheer accident" when a headhunter called.

Although he was new to the entertainment business when he joined Warner, Winski says his IS background with user, vendor and consulting firms has given him the requisite people skills for a company such as Warner.

"I've worked with strategic planners, entrepreneurs and now with deal makers,' he says. "They're all highly intelligent, highly sensitive people and after enough years in the business, you build up a sensitivity in your fingertips in dealing with them. You get away from hard data — it's more personal."

Winski admits that it is fun living in a corporate world in which sharing an elevator ride with Robert Redford is not uncommon. "It makes me more interesting at cocktail parties," he says. "Seriously, it is nice to be in a place where you can see the products enjoyed by the average citizen. I'm a consumer, too."

All those movies, records and cable television shows add up to a $5 billion company with an IS budget of a hefty $100 million. And Warner will soon swell to $11 billion when it completes its merger with Time — whose offices are ironically connected to Warner's through a subterranean shopping concourse below midtown Manhattan.

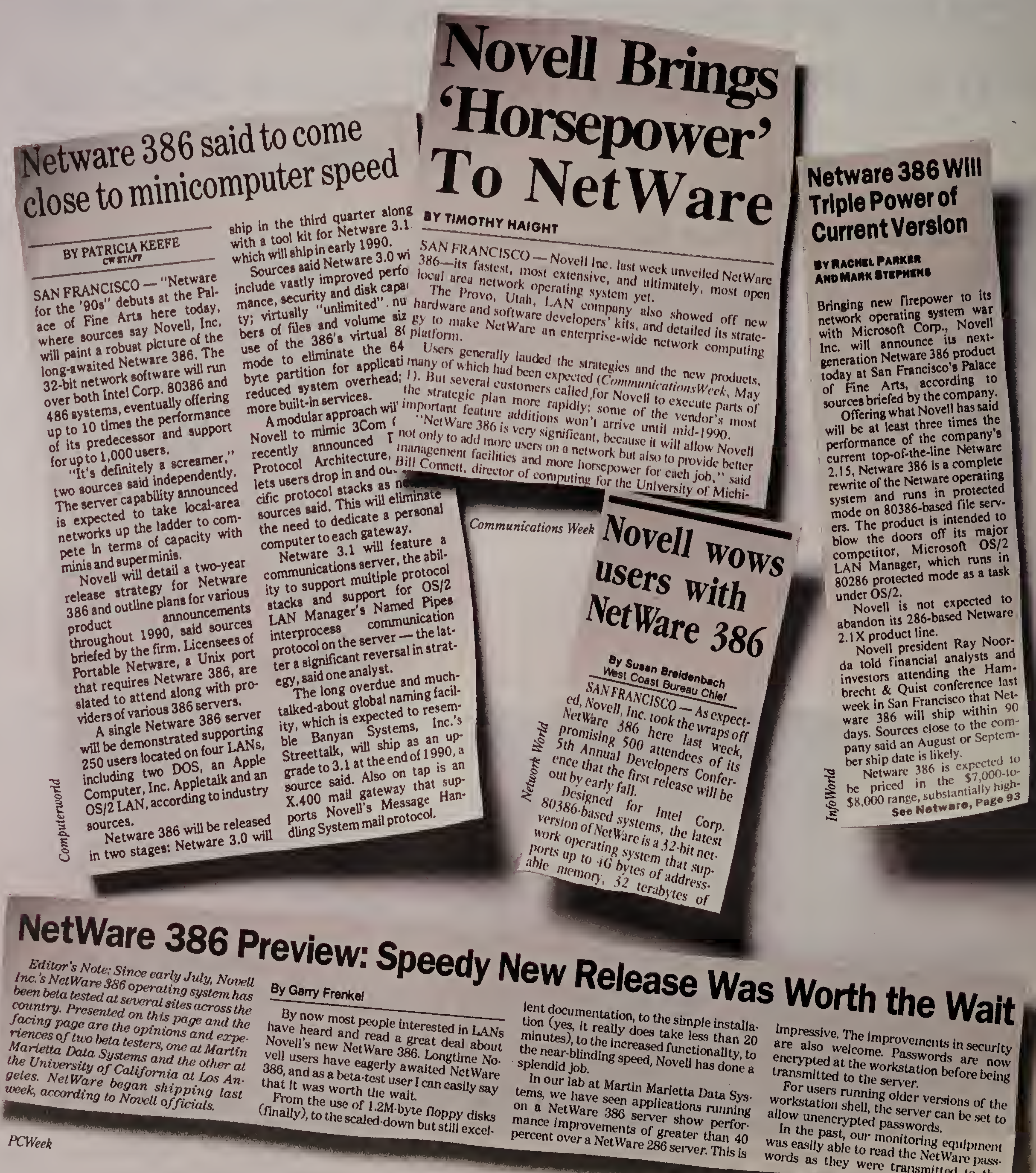
Winski is mum on the details of how the two huge IS operations will be merged but admits he would like to see Warner's philosophy of a tight marriage between computers and telecommunications continue.

"The information infrastructure is ineffective if you separate the two," he says. He has contracted with MCI Communications Corp. for Warner's network management, an area where he believes that centralization yields vendor discount savings that can be shared among the business units.

It is at the business unit level that Winski believes the strategic systems must be developed to better serve Warner's stable of producers and performers. Computer systems may not find the next Tracy Chapman, but they can help keep her as a Warner artist after the talent scouts do. One system, for example, now provides clients with more detailed information about where their royalty payments are derived.

"Our philosophy is that the artist is always right," Winski says. "The creative artist is the lifeblood of this company."

NetWare® 386 makes it easy



Netware 386 said to come close to minicomputer speed

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — "Netware for the '90s" debuts at the Palace of Fine Arts here today, where sources say Novell, Inc. will paint a robust picture of the long-awaited Netware 386. The 32-bit network software will run over both Intel Corp. 80386 and 486 systems, eventually offering up to 10 times the performance of its predecessor and support for up to 1,000 users.

"It's definitely a screamer," two sources said independently. The server capability announced is expected to take local-area networks up the ladder to compete in terms of capacity with minis and superminis.

Novell will detail a two-year release strategy for Netware 386 and outline plans for various product announcements throughout 1990, said sources briefed by the firm. Licensees of Portable Netware, a Unix port that requires Netware 386, are slated to attend along with providers of various 386 servers.

A single Netware 386 server will be demonstrated supporting 250 users located on four LANs, including two DOS, an Apple Computer, Inc. Appletalk and an OS/2 LAN, according to industry sources.

Netware 386 will be released in two stages: Netware 3.0 will ship in the third quarter along with a tool kit for Netware 3.1 which will ship in early 1990.

Sources said Netware 3.0 wi include vastly improved perfo mance, security and disk capa ty; virtually "unlimited". nu bers of files and volume siz use of the 386's virtual 8(mode to eliminate the 64 byte partition for applicati reduced system overhead; more built-in services.

A modular approach wil' Novell to mimic 3Com (recently announced T Protocol Architecture, lets users drop in and ou cific protocol stacks as ne sources said. This will eliminate the need to dedicate a personal computer to each gateway.

Netware 3.1 will feature a communications server, the ability to support multiple protocol stacks and support for OS/2 LAN Manager's Named Pipes interprocess communication protocol on the server — the latter a significant reversal in strategy, said one analyst.

The long overdue and much-talked-about global naming facility, which is expected to resemble Banyan Systems, Inc.'s Streettalk, will ship as an upgrade to 3.1 at the end of 1990, a source said. Also on tap is an X.400 mail gateway that supports Novell's Message Handling System mail protocol.

Computerworld

Novell Brings 'Horsepower' To NetWare

BY TIMOTHY HAIGHT

SAN FRANCISCO — Novell Inc. last week unveiled NetWare 386—its fastest, most extensive, and ultimately, most open local area network operating system yet.

The Provo, Utah, LAN company also showed off new hardware and software developers' kits, and detailed its strategy to make NetWare an enterprise-wide network computing platform.

Users generally lauded the strategies and the new products, many of which had been expected (*CommunicationsWeek*, May 1). But several customers called for Novell to execute parts of the strategic plan more rapidly; some of the vendor's most important feature additions won't arrive until mid-1990.

"NetWare 386 is very significant, because it will allow Novell not only to add more users on a network but also to provide better management facilities and more horsepower for each job," said Bill Connett, director of computing for the University of Michi-

Communications Week

Netware 386 Will Triple Power of Current Version

BY RACHEL PARKER AND MARK STEPHENS

Bringing new firepower to its network operating system war with Microsoft Corp., Novell Inc. will announce its next-generation Netware 386 product today at San Francisco's Palace of Fine Arts, according to sources briefed by the company.

Offering what Novell has said will be at least three times the performance of the company's current top-of-the-line Netware 2.15, Netware 386 is a complete rewrite of the Netware operating system and runs in protected mode on 80386-based file servers. The product is intended to blow the doors off its major competitor, Microsoft OS/2 LAN Manager, which runs in 80286 protected mode as a task under OS/2.

Novell is not expected to abandon its 286-based Netware 2.1X product line.

Novell president Ray Noorda told financial analysts and investors attending the Hambrecht & Quist conference last week in San Francisco that Netware 386 will ship within 90 days. Sources close to the company said an August or September ship date is likely.

Netware 386 is expected to be priced in the $7,000-to-$8,000 range, substantially high-

See Netware, Page 93

InfoWorld

Novell wows users with NetWare 386

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — As expected, Novell, Inc. took the wraps off NetWare 386 here last week, promising 500 attendees of its 5th Annual Developers Conference that the first release will be out by early fall.

Designed for Intel Corp. 80386-based systems, the latest version of NetWare is a 32-bit network operating system that supports up to 4G bytes of addressable memory, 32 terabytes of

Network World

NetWare 386 Preview: Speedy New Release Was Worth the Wait

Editor's Note: Since early July, Novell Inc.'s NetWare 386 operating system has been beta tested at several sites across the country. Presented on this page and the facing page are the opinions and experiences of two beta testers, one at Martin Marietta Data Systems and the other at the University of California at Los Angeles. NetWare began shipping last week, according to Novell officials.

By Garry Frenkel

By now most people interested in LANs have heard and read a great deal about Novell's new NetWare 386. Longtime Novell users have eagerly awaited NetWare 386, and as a beta-test user I can easily say that it was worth the wait.

From the use of 1.2M-byte floppy disks (finally), to the scaled-down but still excellent documentation, to the simple installation (yes, it really does take less than 20 minutes), to the increased functionality, to the near-blinding speed, Novell has done a splendid job.

In our lab at Martin Marietta Data Systems, we have seen applications running on a NetWare 386 server show performance improvements of greater than 40 percent over a NetWare 286 server. This is impressive. The improvements in security are also welcome. Passwords are now encrypted at the workstation before being transmitted to the server.

For users running older versions of the workstation shell, the server can be set to allow unencrypted passwords.

In the past, our monitoring equipment was easily able to read the NetWare passwords as they were transmitted to the

PCWeek

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CALENDAR

DEC. 3-9

Dooley Group Conference: Holistic View of Future Information Technology. Phoenix, Dec. 3-6 — Contact: The Dooley Group, Suite 109, 50 9th Ave. S., Hopkins, Minn. 55343.

International Conference on Design for Manufacturability and Concurrent Engineering. Miami Beach, Dec. 3-6 — Contact: Kim Takita, CAD/CIM Alert, 1050 Commonwealth Ave., Boston, Mass. 02215.

The State of the Art of Industrial Robots. Santa Clara, Calif., Dec. 4 — Contact: Artificial Intelligence Special Interest Group, 206 E. 40th Ave., San Mateo, Calif. 944403.

Automated Data Center Seminar. Newport Beach, Calif., Dec. 4-5 — Contact: KPMG Peat Marwick Main & Co., Executive Education Registrar, 3 Chestnut Ridge Road, Montvale, N.J. 07645.

Implementation Strategies for Integrating Expert Systems Into Mainstream Computing. Arlington, Va., Dec. 4-5 — Contact: Donna Kacin, Decision Support Technology, 125 Cambridge Park Drive, Cambridge, Mass. 02140.

Managing IS in the 1990s. Washington, D.C., Dec. 4-5 — Contact: Laurie Goudreau, Ouellette & Associates, 40 S. River Road, No. 66, Bedford, N.H. 03102.

International Conference on Information Systems (ICIS). Boston, Dec. 4-6 — Contact: Judith Quillard, ICIS '89 Planning and Arrangements Chair, MIT, Cambridge, Mass. 02139.

Leveraging the Information Technology Investment. Washington, D.C., Dec. 4-6 — Contact: The Information Group, P.O. Box Q, Santa Clara, Calif. 95055.

Supporting End-User Strategies. Washington, D.C., Dec. 4-6 — Contact: Technology Transfer Insitute, 741 Tenth St., Santa Monica, Calif. 90402.

Winter Simulation Conference. Washington, D.C., Dec. 4-6 — Contact: Kenneth Musselman, Pritsker Corp., P.O. Box 2415, 1305 Cumberland Ave., West Lafayette, Ind. 47906.

Personal Computer Outlook. San Francisco, Dec. 5-6 — Contact: Technologic Partners, Suite 500, 419 Park Ave. S., New York, N.Y. 10016.

Database World Conference & Exposition. Boston, Dec. 5-7 — Contact: Digital Consulting, 6 Windsor St., Andover, Mass. 01810.

Techconnect West: Navigating the 1990s. Long Beach, Calif., Dec. 5-7 — Contact: Sara von Voss, Techconnect West, Suite 385, 8310 Capital of Texas Highway, Austin, Texas 78731.

Unicom Expo and Conference. Dallas, Dec. 5-7 — Contact: North American Telecommunications Association, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

Human Resources Information Management Society Vendor Fair. New York, Dec. 6 — Contact: HRIMS, Suite 201, 170 Broadway, New York, N.Y. 10038.

Technology Essentials: Getting Computers Down to Business. Boston, Dec. 6, Contact: Index Group, Five Cambridge Center, Cambridge, Mass. 02142.

Connectivity in Mobile Data Networks: Management Solutions for the 1990's. Washington, Dec. 6-7 — Contact: Waters Information Services, P.O. Box 2248, Binghamton, N.Y. 13902.

Consulting Skills for the Information Processing Professional. Washington, D.C., Dec. 6-7 — Contact: Laurie Goudreau, Ouellette & Associates, 40 S. River Road, No. 66, Bedford, N.H. 03102.

Information Systems Strategies. Los Angeles, Dec. 6-7 — Contact: Business Week Executive Program, 1221 Avenue of the Americas, 36th Floor, New York N.Y. 10020.

Inventing the Future of Computing and Communications. Cambridge, Mass., Dec. 6-7 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Video Processing: The New Millenium for Computers and Communications Conference. Newark, N.J., Dec. 6-7 — Contact: Multi-Force Corp., P.O. Box 2355, Clifton, N.J. 07015.

EIS '89. Washington, D.C., Dec. 6-8 — Contact: Elizabeth Simpson, The EIS Institute, 174 Cabot St., Newton, Mass. 02158.

Government Communications Conference. Washington, D.C., Dec. 6-8 — Contact: Conference Manager, U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

Graphics and Image: The New Revolution. Santa Clara, Calif., Dec. 7 — Contact: International Data Corp., P.O. Box 955, 5 Speen St., Framingham, Mass. 01701.

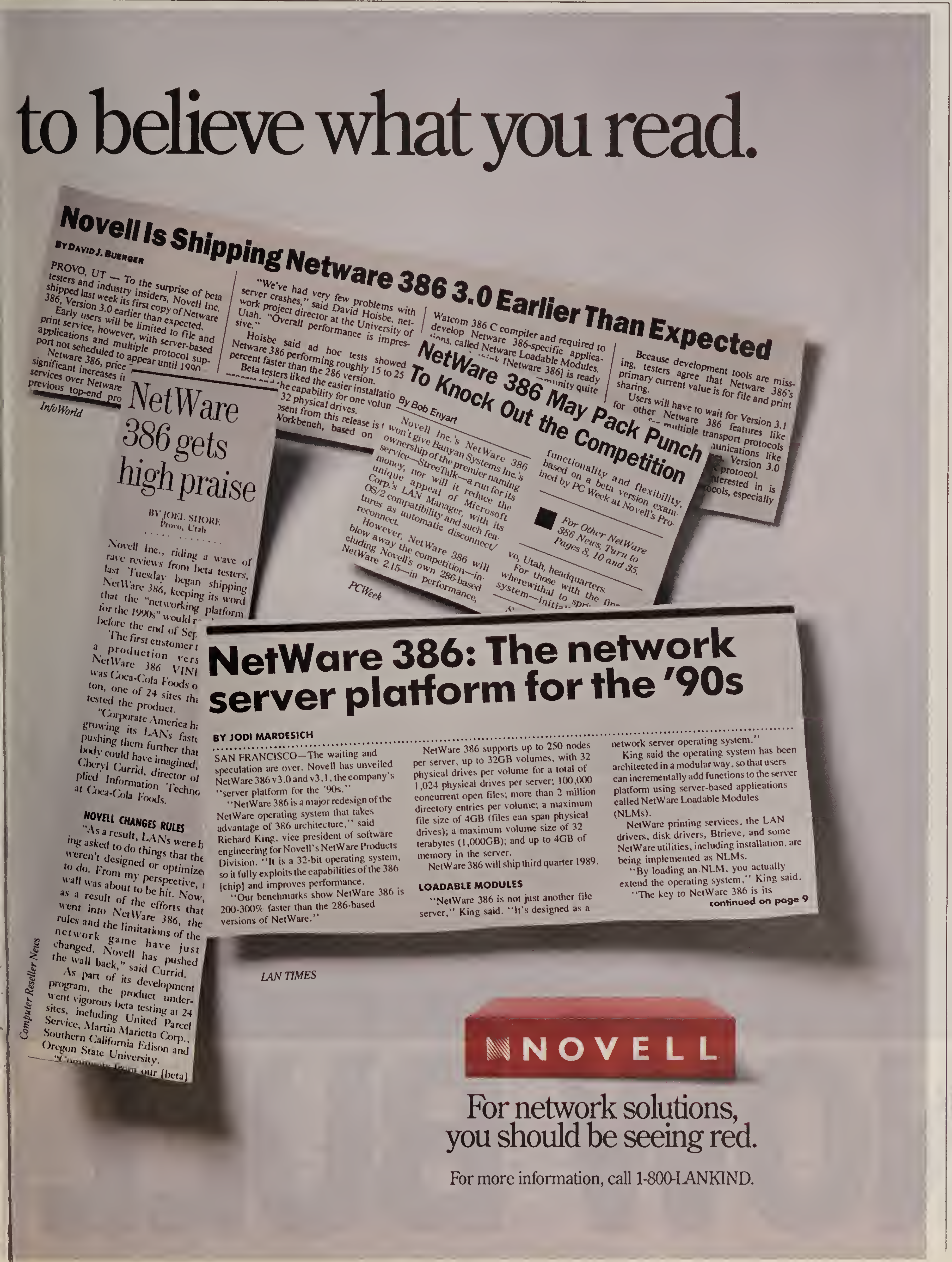
'90s Outlook for Knowledge-Based Systems. Arlington, Va., Dec. 7 — Contact: Ricki Kleist, Software A&E, Suite 500, 1600 Wilson Blvd., Arlington, Va. 22209.

Society for Management of Professional Computing Luncheon. Boston, Dec. 8 — Contact: SMPC, 715 Boylston St., Boston, Mass. 02116.

DEC. 10-16

Furthering Use of Unix in Government. Washington, D.C., Dec. 11-13 — Contact: Federal Open Systems Conference, 4610 Tournay Rd., Bethesda, Md. 20816.

Data Administration Management Association. Rosslyn, Va., Dec. 12 — Contact: DAMA, National Capitol Region, P.O. Box 9625, Arlington, Va. 22209.



to believe what you read.

Novell Is Shipping Netware 386 3.0 Earlier Than Expected

BY DAVID J. BUERGER

InfoWorld

NetWare 386 gets high praise

BY JOEL SHORE
Provo, Utah

NOVELL CHANGES RULES

Computer Reseller News

NetWare 386 May Pack Punch To Knock Out the Competition

By Bob Enyart

For Other NetWare 386 News, Turn to Pages 8, 10 and 35.

PC Week

NetWare 386: The network server platform for the '90s

BY JODI MARDESICH

SAN FRANCISCO—The waiting and speculation are over. Novell has unveiled NetWare 386 v3.0 and v3.1, the company's "server platform for the '90s."

"NetWare 386 is a major redesign of the NetWare operating system that takes advantage of 386 architecture," said Richard King, vice president of software engineering for Novell's NetWare Products Division. "It is a 32-bit operating system, so it fully exploits the capabilities of the 386 [chip] and improves performance.

"Our benchmarks show NetWare 386 is 200-300% faster than the 286-based versions of NetWare."

NetWare 386 supports up to 250 nodes per server, up to 32GB volumes, with 32 physical drives per volume for a total of 1,024 physical drives per server; 100,000 concurrent open files; more than 2 million directory entries per volume; a maximum file size of 4GB (files can span physical drives); a maximum volume size of 32 terabytes (1,000GB); and up to 4GB of memory in the server.

NetWare 386 will ship third quarter 1989.

LOADABLE MODULES

"NetWare 386 is not just another file server," King said. "It's designed as a network server operating system."

King said the operating system has been architected in a modular way, so that users can incrementally add functions to the server platform using server-based applications called NetWare Loadable Modules (NLMs).

NetWare printing services, the LAN drivers, disk drivers, Btrieve, and some NetWare utilities, including installation, are being implemented as NLMs.

"By loading an NLM, you actually extend the operating system," King said. "The key to NetWare 386 is its

continued on page 9

LAN TIMES

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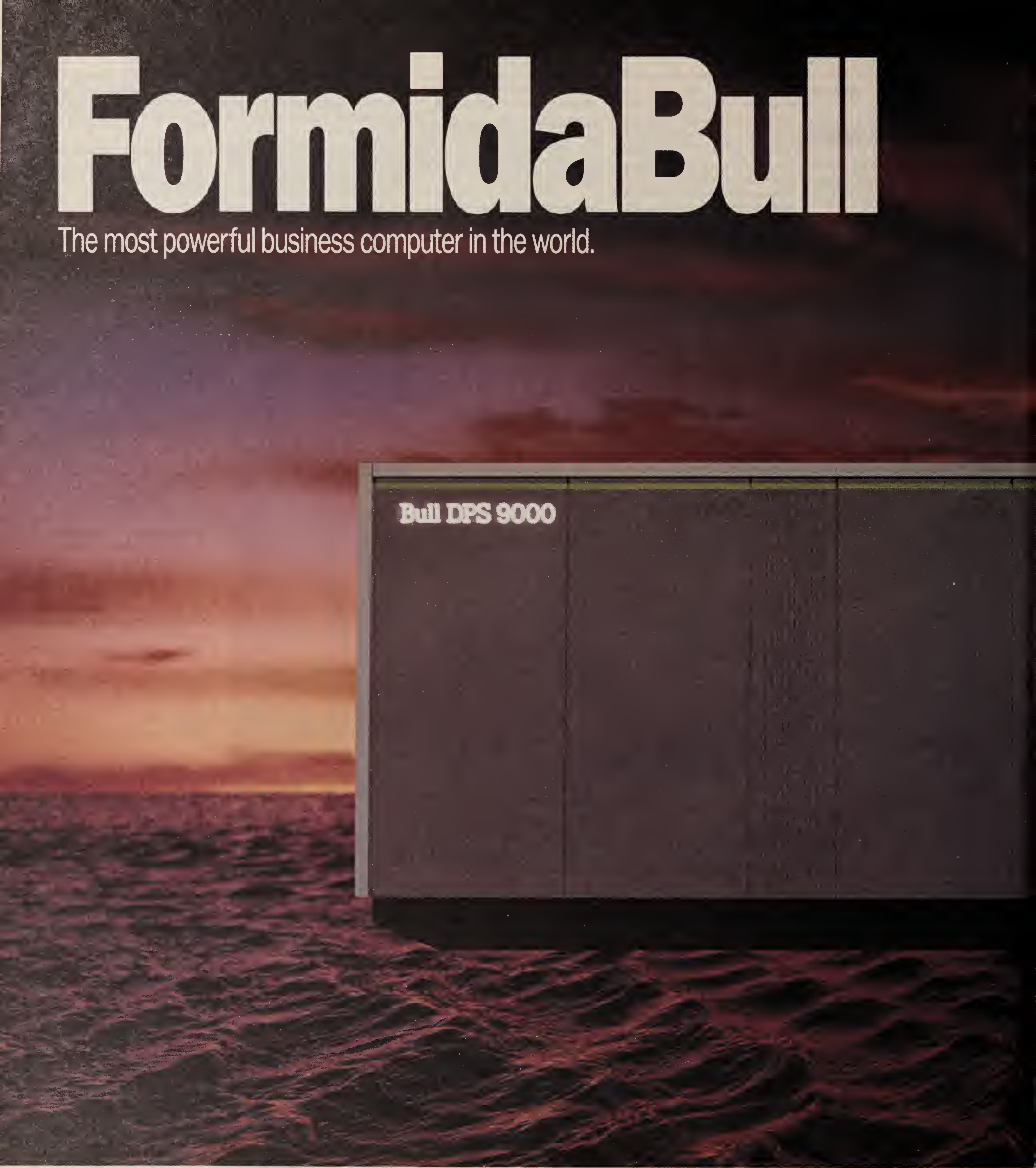

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Speed and dexterity take top billing

LINDA BLECK

MODEMS

BY BRUCE PAGE

There's a lot of talk these days about the demise of the analog modem; it is not all idle chatter. Digital networks are already being used by both large and medium-size businesses to achieve lower costs and higher data transmission speeds. When Integrated Services Digital Network (ISDN) achieves wide-scale availability in the 1990s, ordinary personal computer users will be able to avail themselves of more point-to-point transmission capacity than today's most advanced corporate networks, using high-speed digital interfaces instead of modems.

That said, however, it will still be a long time before analog modems disappear entirely.

A survey of 18,000 medium and large U.S. companies by Computer Intelligence in La Jolla, Calif., shows that higher speed modems are becoming increasingly popular. According to the firm's research, some 11% of all dial-up modems today support transmission speeds of 9.6K bit/sec. and greater, up from 7% just one year ago. On leased lines, 70% of all modems now transmit at 9.6K bit/sec. and greater, up from 62% a year ago.

As for the future, International Data Corp., a market research

Continued on next page

Page is president of Magnetic Press, Inc., a New York-based research firm specializing in communications technologies.

MULTIPLEXERS

BY SANFORD BINGHAM

In recent years, network building has become a major corporate activity. Large and even not-so-large companies can create their own networks out of transmission facilities bought, rented or leased piecemeal from the common carriers. In the interest of both economy and self-determination, many are doing just that.

In this world of do-it-yourself construction and management, the multiplexer occupies a key spot. With this equipment, companies can concentrate their telecommunications traffic onto a minimum of long-haul lines and manage their own facilities rather than leasing or buying that service from the carrier.

Choosing the right piece of multiplexer equipment to handle those jobs can be tricky, however. The purchasing landscape is marked by few domestic and even fewer international standards for transmission or performance management. The standards that do exist are frequently altered and augmented by individual multiplexer manufacturers, creating a world of proprietary hardware.

What this means in practice is that a network manager must purchase all multiplexing equipment from one vendor or be prepared to tackle tasks such as

Continued on page 64

Bingham is editor of "The Bit," a Magnetic Press journal on communications.

INSIDE

Product Face-off

Three vendors provide a new type of 'modem' — the 56K bit/sec. digital service unit. Page 72.

Saved by the Modem

Fiserv meets new federal guidelines for contingency planning with high-speed dial-up backup plan. Page 74.

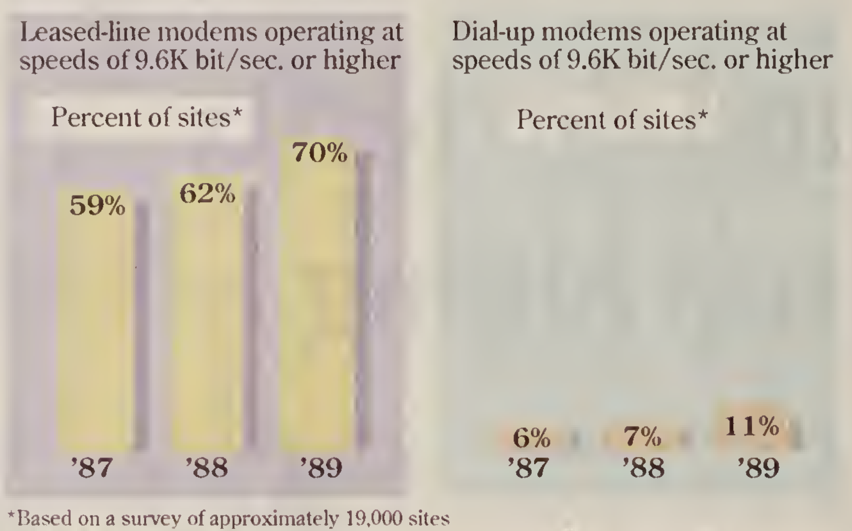
Modems

FROM PREVIOUS PAGE

firm in Framingham, Mass., forecasts that, while total sales of analog modems will decline slightly for each of the next five years, that same time period will see increased use of dial-up and higher speed modems, particularly 9.6K bit/sec. modems that incorporate the CCITT V.32 standard.

Speed dialing

High speed is a strengthening norm for leased-line modems at corporate sites. A newer phenomenon that is expected to grow considerably over the next few years is the high-speed dial-up modem



*Based on a survey of approximately 19,000 sites

SOURCE: COMPUTER INTELLIGENCE

CW CHART: JOHN YORK

V.32 on fire

V.32-standard modems are the hottest products in today's high-speed modem market, and that is a trend that is likely to continue for some time. IDC, for example, forecasts strong growth in the V.32 market segment through 1993, with cumulative annual growth rates in the 44% range.

There are a number of reasons for the explosion of interest. Price is one of them. Prices on V.32 modems running at 9.6K bit/sec. have now fallen below $1,000 from a starting high of $3,495 in January 1986, according to IDC.

An even more important consideration for many buyers, however, is the fact that V.32 provides a standard for interworking among 9.6K bit/sec. modems made by competing vendors.

With this technology, users may choose V.32 modems from a variety of manufacturers with full confidence that they may all work together. Care should be taken, however, that all of the modem manufacturers in a specific network have implemented V.32 fully; several companies offer subsets of the technology that compromise their modems' interoperability with those of other manufacturers.

Second, when V.32 support of 9.6K bit/sec. transmission was extended from leased lines to dial-up in 1988, new and useful combinations started to appear. For example, many V.32 modems that are used in the leased-line environment now have "automatic dial backup" capabilities, which allow the modem to automatically switch into dial-up mode if line quality on the leased circuit drops below a defined threshold.

V.32 is being used extensively in the dial-up market. In that arena, 9.6K bit/sec. provides four times the throughput of the next fastest modem standard for personal computer users: the CCITT V.22bis standard for 2,400 bit/sec. transmission. With the growing importance of data communications and users' needs for higher speeds to transmit desktop publishing and graphics files, V.32 fits the bill perfectly.

In fact, because 9.6K bit/sec. modems are now widely available for dial-up use, some former leased-line users whose transmission needs depend more on speed than on constant communication are finding that dial-up communications can take care of their networking needs quite handily.

Such a switchover makes a great deal of economic sense, says Frank Dzubeck of Communications Network Architects, a consulting firm in Washington, D.C. "The cost of private-line networks is exorbitant today, largely because of local-loop installation charges," Dzubeck says. "The installation cost of a local leased line can approach $1,400, and this installation expense must be incurred on each end of a point-to-point link."

Between two points where dial-up charges are not likely to be prohibitive — within a city or state, say — dial-up 9.6K bit/sec. communications is quite likely a better economic choice today than a leased line. Of course, if you were communicating long-distance, charges would rack up quickly. But in local calling areas, you can pay $50 per month and be on-line most of the time, compared with paying that amount per day on leased lines. Dial-up is also more cost-efficient when data transfer requirements are sporadic.

Technology trends

Aside from V.32, today's high-speed modems incorporate other important features and technologies, including network management functions, error correction and data compression.

Modems that support network management are connected to a central network management site by means of a special signaling side channel (or, in the case of IBM's Netview, an in-band signaling method).

Once the link has been made, network managers can access the modem, monitor the traffic moving through it, diagnose problems that may have occurred and even change the configuration of a given modem remotely. To facilitate network analysis, many network-managed modems also routinely collect data about their own operations and dump it periodically to the central management site for analysis.

Network management may be done on either leased-line or dial-up modems. Today, it is most common on leased lines, but by next year, most dial-up modem manufacturers should be including network management capabilities as a standard feature on their modems.

Six vendors currently offer network management software designed to be used with their dial-up modem products.

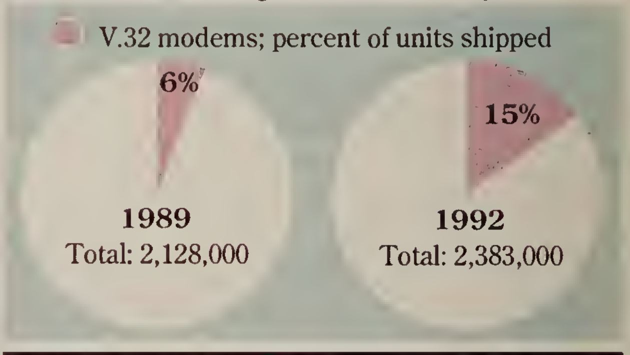
One of the most ambitious implementations is Globalview from Universal Data Systems, Inc., a network diagnostic and control system that provides a Microsoft Corp. Windows graphical interface for monitoring, diagnosing and reconfiguring up to 512 remote devices from a single management workstation.

Considerable strides have also been made in the provision of built-in error correction for high-speed modems. Unlike software-oriented error-correction protocols, which typically act only in file-transfer operations, error-correcting modems verify all elements of a terminal session, even keyboard input. With built-in error correction, users may be assured that what they send is received exactly the same way.

The V.42 error-correction protocol, standardized last year by the CCITT, brings a much-needed standard to modem-based error correction. V.42 may be used in modems of any speed, and some analysts say it will eventually be included in almost all asynchronous modems.

Influence building

V.32 modems are expected to more than double their current market standing over the next three years



SOURCE: INTERNATIONAL DATA CORP.

CW CHART: JOHN YORK

V.42 contains two principal protocols: the LAP-M protocol and Classes 2, 3 and 4 of the Microcom Networking Protocol (MNP). LAP-M is similar in style to the error-correction scheme used in highly reliable packet-switched networks; it is the de fault error-correction method used when two V.42 modems connect.

If both modems support LAP-M, they begin a data transfer based on LAP-M. If not, they fall back to MNP error correction, an older and more widely implemented error-correction standard already built into thousands of modems.

Either way, users with V.42 modems on both sides of any communications link are assured that their communications will be received with no slipped bits.

Data compression is also gaining favor among modem users and manufacturers to get more communications bang for the buck. Using modem-based data compression, the data in a file is automatically recoded into a more compact representation as it passes through the modem, and the modem on the other side decompresses the file to its original form.

Various methods of data compression exist, including a new CCITT data compression standard called V.42bis. Based on the highly efficient Lempel-Ziv compression algorithm, V.42bis provides a standard compression technology that will be adopted by the majority of the world's modem manufacturers. Today, however, most modem-based compression is performed with MNP Class 5 or Class 7 coding.

Depending on the type of data being

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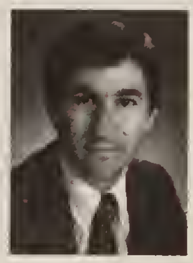

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transmitted, MNP Class 5 will compress data on the fly at anywhere from 1.3-to-1 to 2-to-1. With a 9.6K bit/sec. V.32 modem, therefore, MNP Class 5 can deliver effective data throughput rates of over 19K bit/sec. MNP Class 7 extends the real-time compression to 2.4-to-1, giving a 9.6K bit/sec. modem potential data throughput of over 20K bit/sec.

Data compression is not the only way to wring more data transmission capacity out of a telephone line. Another technique is called "continual line analysis," which divides a telephone circuit into several channels, each of which may be used to carry a part of the data to be transmitted.

Using this technique, the Trailblazer modem from Cupertino, Calif.-based Telebit Corp. achieves communication rates of 18K bit/sec. over dial-up telephone lines — almost as quickly as the fastest leased-line modems allow.

Both data compression and continual line analysis decrease transmission time. Whereas continual line analysis virtually increases bandwidth on a line, data compression reduces the size of the file. The better overall choice of the two techniques is a 9.6K bit/sec. modem with data compression, because continual line analysis can actually slow down transmission if the phone line is dirty. For instance, after splitting the line into 80 channels, the modem may find only 20 of those to be clean enough to use.

Although high speed seems to be the watchword for the next few years, that term is relative; the outlook is not nearly as rosy for very high speed modems as it is for those in the 9.6K-bit/sec. category. The highest speed modems today achieve rates of 14.4K and 19.2K bit/sec. Despite the obvious speed advantage, however, these modems are so costly and relatively inflexible that many users are looking very closely at their needs before buying one of these instead of considering a move to digital. For one thing, they are able to run only over leased lines.

Further, these modems are relatively unsupported by industry standards, and attention to creating any will likely be superseded by the growing interest in finalizing such digital standards as ISDN.

14.4K bit/sec. is the highest speed for which there is an industry standard — V.33, the highest existing bit-rate standard for transmitting over leased lines. Rates of 14.4K bit/sec. can be reached on dial-up lines; US Robotics, Inc. and BT Datacom have shown this with their modem offerings in this class, which run on leased or dial-up lines. But the protocol applied to this speed is V.32 Extended, which has not been approved by the CCITT.

End-user prices of 14.4K bit/sec. modems are in the $1,300 to $5,000 range. Most of the 14.4K bit/sec. modems shipped in 1988 offered built-in network management capability.

19.2K bit/sec. is the highest speed that analog networks can support without the use of data compression. Among 19.2K bit/sec. modems, end-user costs are in the $2,500 to $6,000 range.

The use of these high-speed modems will most likely be restricted to niche markets and to those users with huge analog networks who are unwilling to move to digital but have a dire need to add on transmission speed.

All in all, these high-speed modems are something of a waystation between 9.6K bit/sec. analog transmission and digital, at which few users will stop.

For the vast majority of users, the leading edge of modem technology is 9.6K bit/sec. V.32 modems, particularly those with built-in V.42 data compression. In all likelihood, this segment will own the frontier until the arrival of generally available digital service. At that point, today's leading edge will become tomorrow's commodity — and then all the maps will have to be redrawn. •

ASK THE VENDOR

I am investigating the possibilities of ISDN. We are now using analog 14.4K bit/sec. modems from BT Datacom. When digital service is available, how can we use these in backup situations, as opposed to current on-line situations? Also, we now have dialing and call-out capabilities. Would we continue having these with ISDN?

Dave Hickman
Data Processing Manager
International Speedway Corp.
Daytona Beach, Fla.

BT DATACOM: The 4142TCX V.32/V.33 extended modems that International Speedway is already using allow full-duplex, single backup at 14.4K bit/sec. They are the highest speed dial backup modems available today and are ideal for backup to digital services. Therefore, they can be used in ISDN situations. In fact, BT Datacom presently has customers using the 4142TCX modems exclusively for backup to digital services.

The flexibility of the 4142TCX allows it to be used for a number of data communications applications, including transmission over international circuits. It provides extended V.32 and V.33 functionality using Trellis coded modulation. On single dial-up lines, it provides 4.8K, 7.2K, 9K, 12K and 14K bit/sec. data transmissions. On two- or four-wire leased lines, the 4142TCX transmits data at 4.8K, 7.2K, 9.6K, 12K and 14.4K bit/sec.

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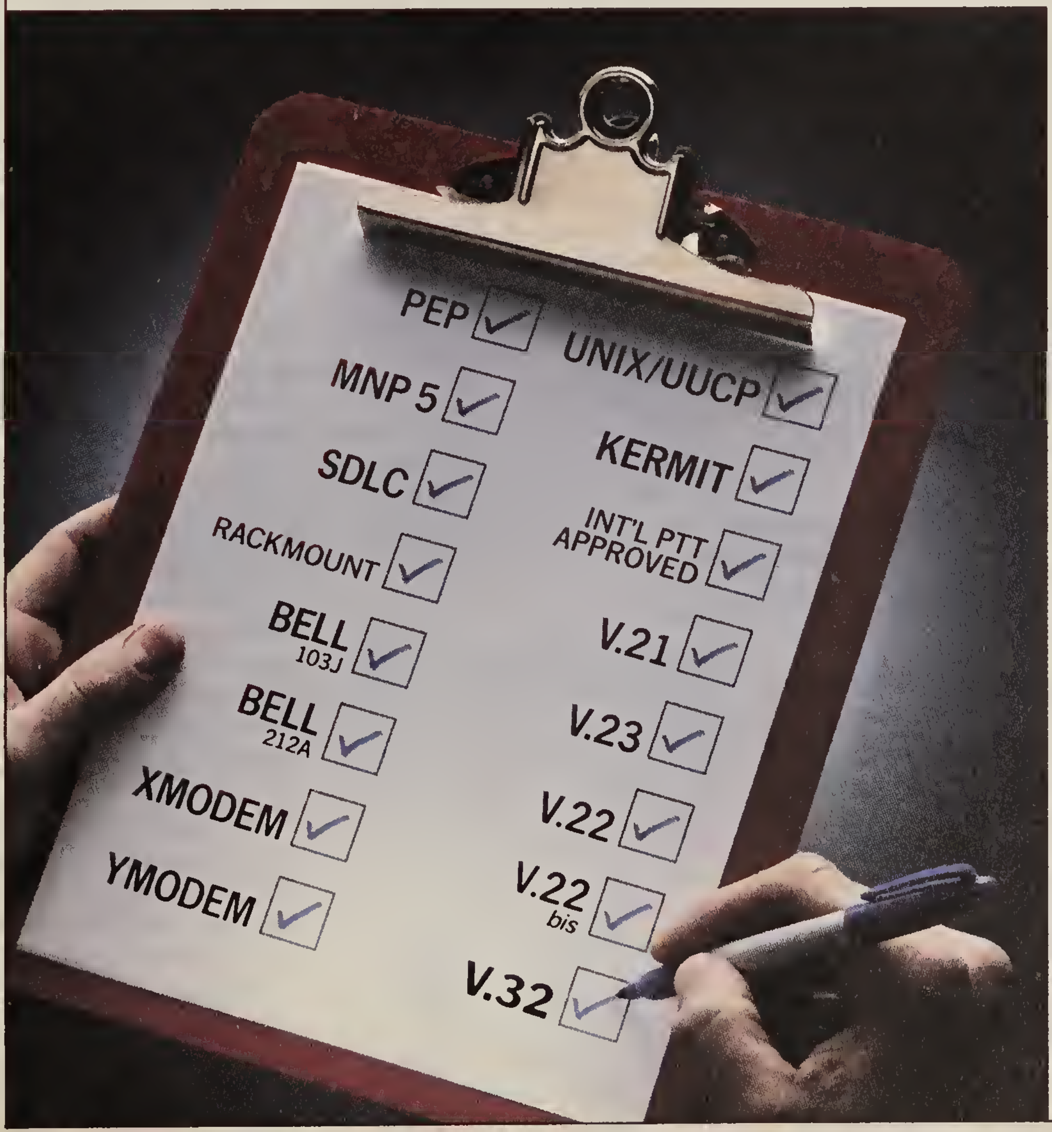

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Multiplexers

FROM PAGE 61

reconciling incompatible code and juggling layers of network management. The job is further complicated by a continuous stream of new offerings at both ends of the bandwidth spectrum.

"Over the next several years, with frame relay, fast-packet switching and fiber, there will be a lot of new protocols," says Robert Follett, senior vice-president at The DMW Group, Inc., a telecommunications consulting firm in Ann Arbor, Mich.

Simply sorting out the many varieties of long-haul multiplexers is a challenge for the uninitiated. There are really only three basic types — frequency division multiplexers, time division multiplexers and statistical time division multiplexers — but these subdivide and multiply based on the type of transmission media and techniques for bandwidth optimization.

The oldest established multiplexing technology is frequency division multiplexing (FDM). This technique divides the 100-Mhz signal on a dual copper line into frequency bands and increases the frequency of each signal to fit a particular band.

Dwindling interest

The market for FDMs has just about dried up, according to Gerry Watkins, research manager for telecom office automation at market research firm Market Intelligence Research Co. in Mountain View, Calif. The carriers rarely use FDMs these days, except for long-haul microwave circuits. This is because the analog FDM signals require multiple wires at the receiving end and are a magnet for electrical interference, or noise.

The only type of FDM that corporate buyers still find useful, Watkins says, is the low-speed specialty area of data-over-voice (DOV) FDMs. "This is an old market," he notes, "but it is one that has found new applications with the proliferation of personal computers in businesses" because DOV devices allow PC workstations that previously stood alone to come on-line.

In addition, there is "a new generation of digital DOV devices that is able to transmit faster with higher data rates," Watkins adds. "If there were only the old-style FDM boxes, there wouldn't be that strong a market. But with the ability to transmit at 64K bit/sec., the market is going to take off."

DOV multiplexers are essentially coder/decoders, which filter voice signals on a subchannel and pass low-speed data on the upper portion of the voice band. This allows simultaneous voice and data transmission, often without the need for a modem.

The disadvantage is that the DOV technology requires empty bandwidth, called a "guard band," between the voice and data signals. The guard band limits the number of signals that may be carried on the channel, consequently reducing the data speed. DOV multiplexers can support an aggregate data rate of up to 9.6K bit/sec., but speeds in the range of 1.8K bit/sec. are more common.

Technology displacement

The technology that displaced FDM is time division multiplexing (TDM). Instead of stacking the signals by frequency bands, TDM slices them by time, giving each of the 24 signals a precisely defined time slot for transmission.

TDM has become the MS-DOS of multiplexing. It drives the T1 services offered by carriers and is the main engine offered by the largest multiplexer manufacturers. TDM now comes in a variety of forms, one of which — statistical TDM — has become important enough to assume the dimensions of an entirely new category.

Statistical multiplexers, which dynamically allocate bandwidth so that only active devices receive a share, have effectively taken over the low-speed end of the TDM market (56K bit/sec. and lower).

At the same time, however, TDM is finding new applications in sub-T1 transmission, usually referred to as fractional T1.

Fractional T1 is a service offered by common carriers that allows users to buy bandwidth in increments greater than 56K bit/sec. but less than the 1.54M bit/sec. of full T1. The advantage of fractional T1 to the carriers is that they can cut up a T1 and sell the parts for more than the whole. The advantage to the user is that it "allows you to extend all these private digital networks down to smaller locations. Up to this point, you needed a full T1's worth of traffic to justify the thing; now you can justify it at smaller bit rates," says Michael Finneran, president of DBRN Associates, Inc., a telecommunications consulting firm in Hewlett Neck, N.Y.

Most of the manufacturers of T1 multiplexers either offer or plan to offer fractional T1 capability. But the task of retrofitting equipment to handle the new service is "some serious work," Finneran says.

"There's been a lag in [retrofitting] the hardware, but they'll all get there eventually. They should all have [fractional T1 capability] by the end of 1990," he says.

Nevertheless, he says, purchasers should still be on the lookout for a T1 multiplexer with fractional capability: "That's a general rule. Fractional T1 should be on the mandatory list."

T3 for me . . . and you

While fractional T1 has allowed smaller users to build networks and existing T1 users to extend theirs, there has been a push to develop hardware for larger signals — T3 transmission.

T3 is the term used by phone companies to describe their DS-3 rate of 44.74 bit/sec., which is equivalent to 28 T1 lines. Until recently, the demand for T3 outside of the phone companies themselves has been negligible. But with the ever-increasing use of telecommunications, a crossover to T3 is becoming a more realistic consideration for many T1 users, Follett says.

"Where do you as an end user need a lot of bandwidth? You may want to do videoconferencing, or you have a tremendous amount of voice traffic. Most T3 is justified for voice, but there are other ways to use the bandwidth," he says.

Finneran suggests that, given their current pace of expansion, local-area networks may soon present another argument in favor of private use of T3. "There aren't that many users with eight T1 facilities running in parallel between two locations right now," he says.

"But if you keep putting in bridging devices between LANs, or even terminals, that's going to need a full T1 to operate. A few of those, plus normal data traffic, and then you're getting close to a T3."

T3 can be provided for private network use over either digital microwave or fiber-optic circuits. However, carrier-provided circuits are predominantly fiber-based. Fiber circuits, with their low error rates and near-infinite capacity, are encouraging the development of higher speed packet-based multiplexing technologies.

As the phone companies discovered long ago, TDM transmits empty space when the device being polled is not active. This inefficiency, coupled with the development of the microprocessor, originally led the carriers to develop forms of statistical time division multiplexing. Statistical TDM was not really designed for the high-speed end of the market, however.

What multiplexer people call "statistical multiplexing" is generally low-speed packet switching, specifically that using the international X.25 protocol. While suitable for data transmission, it is impractical for voice communications because of the delays it introduces into the transmission. Since the speed of the transmission varies with the traffic on the line, packets get delayed when traffic is heavy.

As a consequence, for high-speed multiplexing — particularly involving voice as well as data — basic TDM and fixed allocation schemes have remained the norm. "End users want to build networks that integrate voice and data, and in this domain, high-speed time division multiplexers are more efficient than statistical multiplexers," Watkins explains. According to Finneran, however, that rule may soon change. "Now," he says, "we're seeing the potential of high-speed dynamic allocation systems, specifically fast packet."

Vocal advantage

Fast packet has two advantages over existing multiplexing technologies: It not only carries voice but also carries about twice as many conversations on the same circuit as TDM.

The most rudimentary T1 multiplexer — a channel bank — will carry 24 voice trunks on the T1 facility at 64K bit/sec. per voice channel. The most advanced versions, which use a compression technique called Adaptive Differential Pulse Code Modulation (ADPCM), sometimes carry twice that number. But fast packet can deliver up to 96 voice channels per T1.

The reason for this difference? Fast-packet technology knows that voice conversations are a half-duplex activity — usually only one person speaks at a time. TDM and other multiplexing schemes carry voice over full-duplex channels, wasting half the bandwidth. Statistical TDM systems, including packet switching, assign bandwidth in bursts. "Fast packet switches increase capacity because they allocate capacity when you talk and give it away when you shut up," Finneran says.

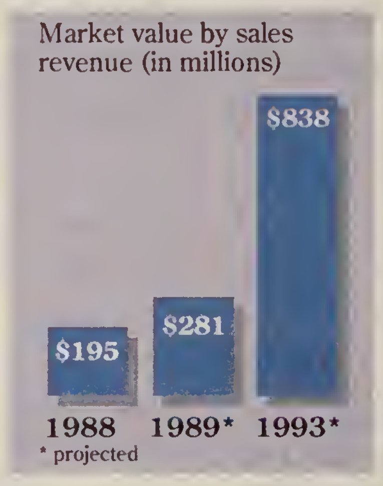
Another advantage of fast-packet switching is that it offers more transmission speed. Emerging fast-packet systems are taking advantage of a development known as Frame Relay,

Three-act performance

Market research firm Frost & Sullivan, Inc. in New York divides the fast-growing T1 multiplexer market into three categories, based on functionality. Market projections and sales forecasts for each of these tiers vary considerably, according to that firm.

What Frost & Sullivan refers to as the Tier 1 market consists of high-speed systems capable of handling both analog and digital voice interfaces, with a potential T1 line capacity of 256 links.

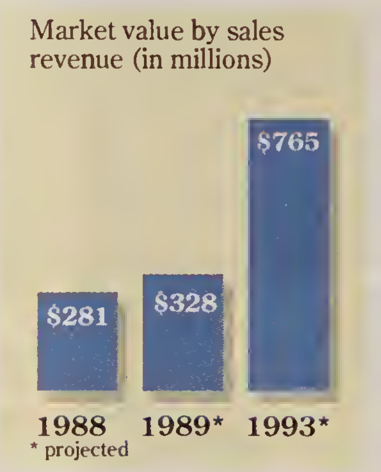
Tier 1



These systems offer the ability to manage a network in a way that permits essentially transparent transmission to voice, data and image devices connecting through the nodes.

Prices for these systems, which currently range from $40,000 to $250,000 — depending on configuration — are expected to decrease by 7% a year through 1993, largely because of changes in configuration.

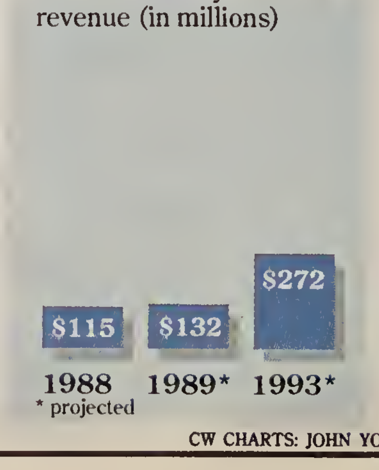
Tier 2



Tier 2 consists of T1 data networking multiplexers. This equipment has been around since the earliest days of the T1 market, gradually evolving to include some of the attributes of nodal processors and some voice capability, mostly on an individual channel basis.

No price change is expected in this group.

Tier 3



Tier 3 is made up of specialty equipment, such as drop and insert multiplexers.

Drop and insert multiplexers are 70% to 80% less expensive for low-density access to a T1 digital transmission system than the use of back-to-back conventional multiplexers. Prices are expected to remain stable in the next four years.

CW CHARTS: JOHN YORK

which was originally developed for use in large X.25 networks to reduce the error correction done in intermediate nodes.

Traditionally, an X.25 intermediate node has been required to buffer the incoming signal, perform an error correction known as cyclical redundancy check (CRC) and then pass the signal on.

However, Follett says, "The thought was that as networks become digital and we migrate toward fiber, we will have fewer transmission errors. So why do all that error checking in the middle of the network? Frame relay does the error checking only at the end nodes, so the intermediate nodes can pass data much faster."

The extra speed of frame relay, according to Finneran, creates the potential for "a dynamically allocatable, high-speed transmission service to interconnect geographically dispersed LANs. Instead of putting a great big pipe, such as a T1 bridge or router, between two LANs, you could provide a 1.5M bit/sec. connection to the fast-packet gadget. This way when I'm not transferring data between the LANs, I could use the pipe to transfer voice or data from other LANs."

Until recently, it was impractical to make a T1-rate dynamic-allocation device, but there are now two on the market: the Stratocom ITX and the AT&T Integrated Access and Cross Connect (IACS). The Stratocom ITX was available first and is beginning to cut a niche in the T1 multiplexing market. It remains unclear whether AT&T will sell the IACS outside of the phone companies.

No other vendors have announced product intentions.

Thus, users must face a choice between going with an established vendor offering that may soon be an outdated technology or an upstart vendor with a nonstandard box. "The question," Finneran says, "is whether it's worth the risk of using a vendor that's been around for under five years and has less than 5% market share."

Even the market leaders have built their domains on proprietary technologies. Indeed, there will always be proprietary architectures in the multiplexer market, Vertical Systems' Cochran says, because even if standards are developed, the vendors will want to add bells and whistles to their products.

"The hope is that there will be some common ground and some interoperability, but in reality that's a long time coming," he says. •

ASK THE VENDOR

My company is using Network Courier, a LAN-based dial-up product from Consumers Software. How do I establish different post offices on a single file server, and how do the external personal computers place mail in the appropriate post office?

Del R. Guynes
Account Manager
Jones Lightwave Ltd.
Englewood, Colo.

CONSUMERS SOFTWARE, INC.: Any number of post offices can be installed in Network Courier Version 2.0 on a single file server. The Install procedure allows you to name the directory/path the post office database will be installed in.

In Network Courier Version 1.0, the Install program was in a fixed directory called Courier on the root of the file server.

For Novell users, this limited them to one post office per file server. For IBM networks in V1.0, multiple post office installations on a single file server were possible.

On a Novell network with Version 2.0, each post office is accessed via a different drive mapping. For IBM networks, drive mappings may be established as above, or access can be made driveless using the V2.0 advanced security option.

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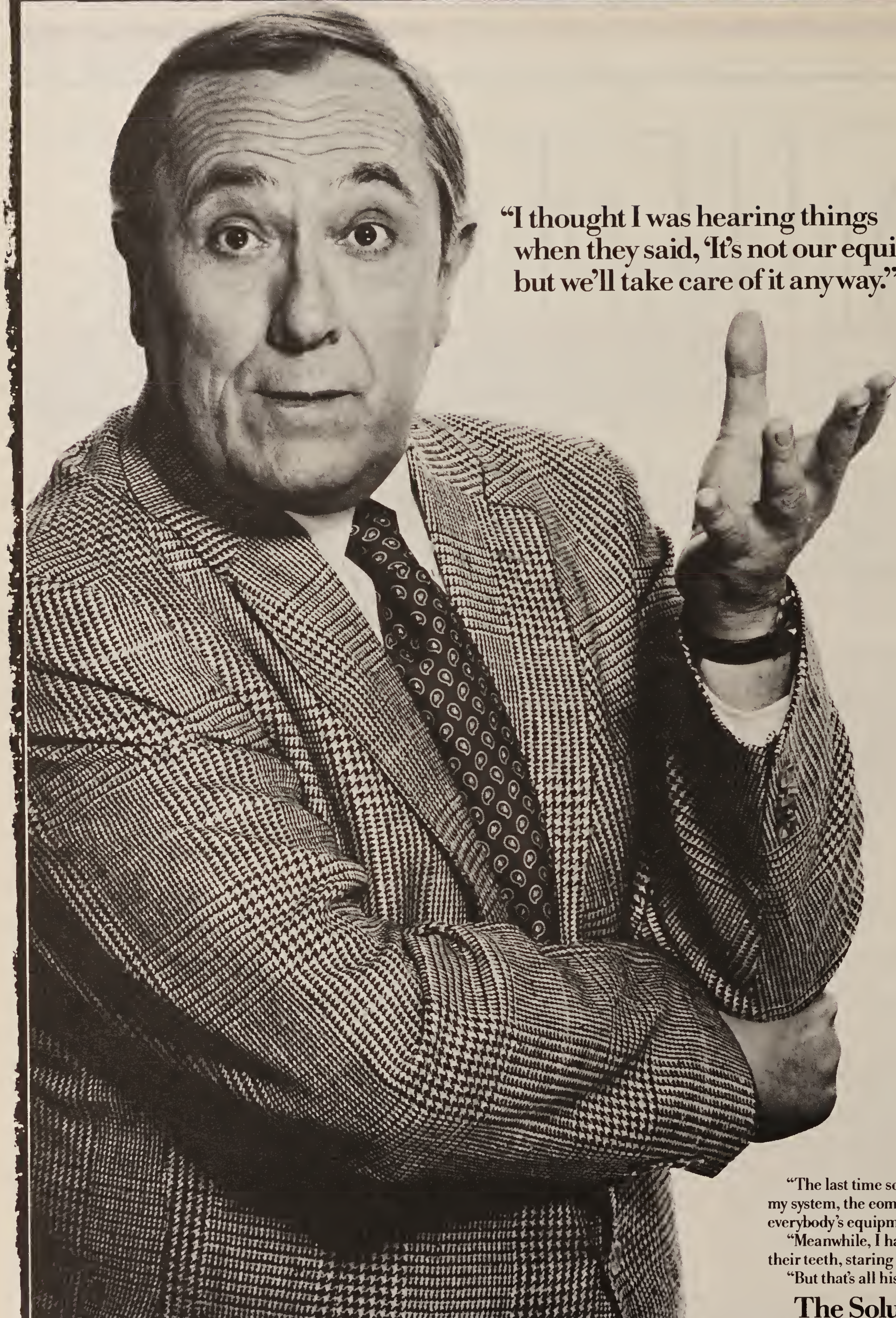
T1 multiplexers

VENDOR	PRODUCT	SUPPORTS T3 THROUGH A DIRECT INTERFACE	T1 LINES SUPPORTED	POINT-TO-POINT OR MULTIPOINT	ASYNCHRONOUS SPEED (bit/sec.)	SYNCHRONOUS SPEED (bit/sec.)	INTERFACES SUPPORTED	FRAMING OPTIONS SUPPORTED	DIAGNOSTIC/ALARM FEATURES SUPPORTED	OFFERS SINGLE-POINT NETWORK CONTROL	LEVELS OF REDUNDANCY SUPPORTED	TYPES OF TRANSMISSION	VOICE-COMPRESSION METHODS	BIT OR BYTE INTERLEAVED	DROP AND INSERT CAPABILITIES	AUTOMATIC REROUTING CAPABILITIES	PRICE
Advanced Compression Technology, Inc. **(818) 889-3618**	SDM-1 Speech Data Multiplexer	No	None	Point-to-point	NA	Up to 19.2K	RS-232, 2-/4-wire E&M[1] signaling	Proprietary	None	Yes	None	Data, voice	Adaptive predictive coding	Byte	No	No	$2,380
AEG Bayly, Inc. **(416) 683-8200**	T3 Omniplexer	Yes	2	Multipoint	150-19.2K	2.4K-64K	RS-232, G.703, V.35	D4, ESF[2]	Digital milliwatt, loopback, printout with date/time	No	Bypass	Data, voice	ADPCM[3]	Byte	Yes	No	$2,000-$7,000
Amdahl Corp. **(800) 544-5376** **Dept. 274**	NPS/2745 Resource Manager	No	48	Multipoint	300-19.2K	2.4K-1M	CCITT V.35, DSX-1, VF, 2-/4-wire E&M (Type 1, 2, 4, 5, FXS, FXO)	Accunet 1.5, R1.5, DACS, DDS, D3/D4, ESF, M24	Circuit; BERT[4]; delay control; DDS loop; digital milliwatt; loop, major, minor, critical, logging and 8-user alarms	Yes	Common control modules	Data, voice, video	ADPCM, M44, PCM[5]	Byte	Yes	Yes	$17,600
Applied Spectrum Technologies, Inc. **(612) 379-7114**	Centra T1 Multiplexer	No	No	Multipoint	Up to 19.2K	4.8K-1.5M	DSX-1, RS-232, RS-530, V.35	D4, ESF	Error rate, power	Yes	Common logic, power supply	Data, voice, video	PCM	Byte	Yes	No	$3,800
Astrocom **(612) 227-8651**	NX6456	Yes	1	Point-to-point	NA	56K-64K	RS-422, V.35	D4, ESF	Local and remote loopback, out of frame, remote failure, unframed ones	No	Redundant composite, CSU, power supply	Data	None	NA	No	No	$4,500
AT&T Paradyne **(800) 482-3333**	Acculink T1 Multiplexers	No	NP	Multipoint	50-19.2K	1.2K-1.5M	DS-1, DSVDP, MIL[6] 188-114, OCUDP, RS-232, RS-422, V.35	D4, ESF	62411, 43801, BERT, all loopback noninteractive tests	Yes	All common equipment and trunk interface	Data, voice, video	ADPCM	Both	Yes	Yes	$8,000
Avanti Communications **(617) 551-3333**	Open Network Concentrator 100	No	Up to 2	Point-to-point	50-19.2K	2.4K-1.5M	RS-232, RS-449/422, V.35	D4, auto framing	Local and remote loopbacks, generates 104-Hz test tone, set signaling bits, querying status on multiplexor, alarm reporting	Yes	Power supply, high-speed logic, T1 fallback	Data, voice, video	ADPCM	Both	No	No	$5,300
	Open Network Concentrator 2000	No	12	Multipoint	1.2K-38.4K	1.2K-1.5M	DSX-1, RS-232, RS-449, V.35, 4-wire VF	D4	Background diagnostics, carrier group alarm, loopbacks	Yes	Common logic, power supply, T1 aggregate	Data, voice	ADPCM, M44	Both	Yes	Yes	$16,000
Aydin Controls **(215) 542-7800**	6116 Fractional T1 Multiplexer	No	1	Point-to-point	NA	1.2K-64K	RS-232, V.35, 4-wire E&M	Proprietary	Common equipment, line faults, power supply	No	None	Data, voice	Variable quantizing level	Bit	No	No	$6,750+
	6248A-10	No	1	Point-to-point	NA	1.2K-768K	RS-232, RS-449, V.35, 4-wire E&M	D4 on aggregate	Common equipment, line faults, power supply	No	Common logic, power	Data, voice, video	Variable quantizing level	Bit	Yes	No	$10,820+
	6248A-20	No	1	Multipoint	NA	1.2K-768K	RS-232, RS-449, V.35, 4-wire E&M	D4 on aggregate	Common equipment, line faults, power supply	Yes	Common logic, power	Data, voice, video	Variable quantizing level	Byte	Yes	No	$12,020+
	6223 Fractional T1 multiplexer	No	1	Point-to-point	NA	1.2K-768K	RS-232, RS-449, V.35, 4-wire E&M	Proprietary	Common logic, power supply, loss of sync and aggregate	No	Common logic, power	Data, voice, video	Variable quantizing level	Bit	No	No	$10,660+
	6296	No	1	Point-to-point	NA	1.2K-768K	RS-232, RS-449, V.35, 4-wire E&M	D4 on aggregate	Common equipment, line faults, power supply	Yes	Common logic, power	Data, voice, video	Variable quantizing level	Packetized	Yes	No	$21,000
BBN Communications **(617) 873-2973**	T/500 CSW	No	Up to 30	Multipoint	50-64K	50-768K	DSX-1, G.703/704, 4-wire E&M, RS-232, V.35	D4, ESF, G.704, proprietary	Local and remote diagnostics	Yes	Common logic, disks, power supply, trunks	Data, voice, video	ADPCM, PCM	Byte	Yes	Yes	$35,000-$135,000
Canoga-Perkins Corp. **(818) 718-6300**	Dual Composite T1 Multiplexer, Model 3140	Yes	2	Point-to-point	38.4K	64K	RS-232, RS-449, V.35	D4, DCM 30, ESF	Major and minor alarms, remote control dial-in testing, local and remote loopbacks, flags frame and carrier loss	Yes	Power supply, system	Data, voice	PCM	Byte	Yes	No	$11,000
CASE/Datatel **(800) 424-4451**	DCP9000 Series	No	Up to 40	Both	150-38.4K	600-1.5M	RS-232, RS-422, V.35	D4, ESF, G.703	Local and remote loopbacks, automatic internal diagnostics to board level, out of frame, remote failure, BERT, major and minor alarms	Yes	Links, logic, power supply	Data, voice, video	ADPCM, PCM	Byte	Yes	Yes	$4,400-$16,500
Coastcom **(415) 825-7500**	D/I Mux III	No	2	Multipoint	19.2K	2.4K-1.5M	RS-232, RS-422, V:35	ESF, SF[7]	All T1 ESF, internal self-check	No	Power supply, T1 interface	Data, voice, video	ADPCM (optional)	Byte	Yes	No	$2,600
Codex Corp. **(800) 426-1212** **Ext. 7215**	6290	No	16	Multipoint	1.2K-19.2K	1.2K-1.3M	RS-232, RS-449/422, V.35	D4, ESF	AT&T 62411, BERT, major and minor alarms, relay closures/external indicators, local and remote loopbacks, automatic isolator, network alarm	Yes	Total circuit redundancy	Data, voice, video	Voice-activated detection, ADPCM	Fast packet	Yes	Yes	$12,000
Data Switch Corp. **(203) 926-1801**	T1 Switch Link	No	20	Multipoint	300-19.2K	300-2M	RS-232, RS-422, V.35, X.21	D3, D4	CRC errors, T1 slips, errored seconds, frame loss, line down, power failure	Yes	Completely redundant, power and control	Data, voice, video	ADPCM	Byte	Yes	Yes	$24,000
Digital Communications Associates, Inc. **(404) 442-4000**	System 9000	No	1-36	Multipoint	50-19.2K	1.2K-1.5M	RS-232, RS-449, V.35, X.21	D4, ESF	All cards hardware, graphics for all hardware components, loopbacks, self-test hardware	Yes	All T1 aggregates, common equipment, power supply, trunks	Data, voice, video	ADPCM	Byte	Yes	Yes	$25,000-$175,000
Digital Link Corp. **(800) 441-1142**	DL551VX-FT	No	1	Multipoint	NA	56K-1.5M	RS-449, V.35	D4, ESF, unframed	All loopbacks, all AT&T-recognized alarms and variable thresholds, QRSS generation and detection, self-test	Yes	None	Data	None	Byte	No	No	$3,495

[1] Electrical and mechanical [2] Extended self-framing [3] Adaptive differential pulse code modulation [4] Bit error rate test [5] Pulse code modulation [6] Military standard [7] Self-framing

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld.* When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT	SUPPORTS T3 THROUGH A DIRECT INTERFACE	T1 LINES SUPPORTED	POINT-TO-POINT OR MULTIPOINT	ASYNCHRONOUS SPEED (bit/sec.)	SYNCHRONOUS SPEED (bit/sec.)	INTERFACES SUPPORTED	FRAMING OPTIONS SUPPORTED	DIAGNOSTIC/ALARM FEATURES SUPPORTED	OFFERS SINGLE-POINT NETWORK CONTROL	LEVELS OF REDUNDANCY SUPPORTED	TYPES OF TRANSMISSION	VOICE-COMPRESSION METHODS	BIT OR BYTE INTERLEAVED	DROP AND INSERT CAPABILITIES	AUTOMATIC REROUTING CAPABILITIES	PRICE
Digital Link Corp. **(800) 441-1142**	DL551VX	No	1	Point-to-point	NA	5.6K-1.5M	RS-449, V.35	D4, ESF, unframed	All loopbacks, all AT&T-recognized alarms and variable thresholds, QRSS generation and detection, self-test	Yes	None	Data	None	Bit	No	No	$2,995
DSC Communications Corp. **(800) 777-6804**	CP1000, CP2000	No	Up to 20	Multipoint	300-19.2K	1.2K-1.5M	RS-232, RS-422, V.35, X.21	D3/D4, ESF, E1 CEPT	Automatic internal diagnostics to board level, local and remote loopbacks, DDS line test codes, alarm log, major and minor alarms, flags frame loss and carrier loss	Yes	Common equipment, power supply	Data, voice, video	ADPCM, M44	Byte	Yes	Yes	$4,500-$7,000
Fibermux Corp. **(818) 709-6000**	Magnum FX4400	Yes	16	Multipoint	Up to 4.7M	Up to 4.7M	DS-1, RS-232, T1, V.35, IBM 3270 and 5250, 802.3, 802.5, Arcnet, Appletalk	AMI, B8ZS	Loss of synch, power, coding violation, any low-speed loss of synch, local and remote loopbacks, major and minor alarms	Yes	Common equipment, logic, power supply, shared interface	Data, voice, video	None	Bit	Yes	No	$5,000
Gandalf Data Limited **(613) 723-6500**	Starmaster	No	Up to 14	Multipoint	50-19.2K	2.4K-1.5M	RS-232, RS-422, V.11, V.35, T1	Q.931, proprietary	Clock, link, node, port	Yes	Control, redundancy, T1 trunk redundancy	Data	None	Bit	Yes	Yes	$30,000-$150,000
	ISDX	No	NP	Multipoint	1.2K-38.4K	1.2K-2M	CEPT, RS-232, RS-449, T1, V.35, E&M	Accunet 1.5, D4, ESF, SF, G.703/704	Clock, link, node, port	Yes	Control, trunk	Data, voice	ADPCM, proprietary	Bit	Yes	Yes	$25,000-$250,000
General Datacomm, Inc. **(203) 574-1118**	Megamux TMS	No	Up to 32	Multipoint	Up to 19.2K	Up to 1.5M	G.703/704/732, RS-422/423, 232D, T1/D4, V.10/11, V.35, MIL 188-114	D4, DSO, ESF, proprietary	Complete local and aggregate loopbacks, major and minor alarms	Yes	Power supply, common cards, transmission facility	Data, voice, video	ADPCM, ASP (proprietary), CVSD, PCM	Both	Yes	Yes	$17,000
	Megamux TMS Compact	No	Up to 4	Multipoint	Up to 19.2K	Up to 1.5M	G.703/704/732, RS-422/423, 232D, T1/D4, V.10/11, V.35, MIL 188-114	D4, DSO, ESF, proprietary	Complete local and aggregate loopbacks, major and minor alarms	Yes	Power supply, common cards, transmission facility	Data, voice, video	ADPCM, ASP (proprietary), CVSD, PCM	Both	Yes	Yes	$12,630
	Megamux Plus	No	1	Point-to-point	Up to 19.2K	Up to 1.5M	G.703/704/732, RS-422/423, 232D, T1/D4, V.10/11, V.35, MIL 188-114	D4, DSO, ESF, proprietary	Complete local and aggregate loopbacks, major and minor alarms	Yes	Power supply, common cards, transmission facility	Data, voice, video	ADPCM, ASP (proprietary), CVSD, PCM	Bit	Yes	Yes	$4,315-$15,175
IBM **(800) 426-4268**	9736 IDNX/20	No	15	Multipoint	75-19.2K	1.2K-1.3M	Biphase, CCITT G.703, DSX-1, HSDS, MIL-188, RS-232, RS-422/499 V.35, X.21	D4, ESF	ESF, V.54 loops, local and remote loopbacks, BERT, self-test, security, alarm reporting, out of frame, link outage, major and minor alarms, interface to Netview	Yes	Common equipment, modules, trunks, control logic, voice channel	Data, voice, video	ADPCM	Byte	Yes	Yes	$20,000-$200,000
	9737 IDNX/40	No	15	Multipoint	75-19.2K	1.2K-1.3M	Same as above	D4, ESF	Same as above	Yes	Common equipment, modules, trunks, control logic, voice channel	Data, voice, video	ADPCM	Byte	Yes	Yes	$20,000-$200,000
	9738 IDNX/70	No	96	Multipoint	75-19.2K	1.2K-1.3M	Same as above	D4, ESF	Same as above	Yes	Common equipment, modules, trunks, control logic, voice channel	Data, voice, video	ADPCM	Byte	Yes	Yes	$20,000-$200,000
Infotron Systems Corp. **(609) 424-9400**	Infostream NX3000	Yes	4	Multipoint	50-19.2K	2.4K-1M	G.703, MIL 188-114, RS-232, RS-422, CCITT V.24, V.35, V.11, 2-/4-wire E&M (types 1, 2, 4, 5)	B8ZS, D4, ESF, G.732/703, NTT	Local and remote link and channel loopback, out of frame, link outage, out of synch errors, ongoing logic, self-testing, logic and power failure detect	Yes	None	Data, voice, video	ADPCM, PCM, proprietary	Byte	Yes	Yes	$11,000
	Infostream NX3040	No	2	Feeder Mux	50-19.2K	2.4K-1M	Same as above	Same as above	Same as above	Yes	Power supply, master logic modules, link controller	Data, voice, video	ADPCM, PCM, proprietary	Byte	No	No	$10,500
	Infostream NX3200	Yes	8	Multipoint	50-19.2K	2.4K-1M	Same as above	Same as above	Same as above	Yes	Same as above	Data, voice, video	ADPCM, PCM, proprietary	Byte	Yes	Yes	$20,000
	Infostream NX4600	No	21	Multipoint	50-19.2K	2.4K-1M	Same as above	Same as above	Same as above	Yes	Same as above	Data, voice, video	ADPCM, PCM, proprietary	Byte	Yes	Yes	$30,000
Integrated Telecom Corp. **(214) 234-3340**	Accustream 200	No	Up to 2	Point-to-point	NA	Up to 1.5M	RS-422/449, V.35	D4, ESF	Local, remote and self-test	Yes	None	Data, video	None	Byte	No	No	$4,995
	Accustream 1000	No	14	Multipoint	2.4K-19.2K	2.4K-1.5M	RS-232, RS-422/449, V.35	D4, ESF	Local, remote, BERT and self-test; password security; alarm reporting; reroute on alarm; time-of-day switch-over	Yes	Data, logic, power, T1 interface	Data, voice, video	ADPCM	Byte	Yes	Yes	$6,500
	Accustream 2000	No	16	Multipoint	1.2K-19.2K	1.2K-1.5M	RS-232, RS-422/449, V.35	D4, ESF	Same as above	Yes	Same as above	Data, voice, video	ADPCM	Byte	Yes	Yes	$8,500
	Accudacs Series I	No	32	Multipoint	2.4K-19.2K	2.4K-1.5M	RS-232, RS-422/449, V.35	D4, ESF	Same as above	Yes	Same as above	Data, voice, video	ADPCM	Byte	Yes	Yes	$10,800
	Accudacs Series II	NP	34	Multipoint	1.2K-19.2K	1.2K-1.5M	RS-232, RS-422/449, V.35	D4, ESF	Same as above	Yes	Same as above	Data, voice, video	ADPCM	Byte	Yes	Yes	$12,500
Intraplex, Inc. **(508) 486-3722**	TDM-150 Series Multiplexers	No	Up to 2	Multipoint	Up to 19.2K	Up to 1.5M	RS-232, RS-449, V.35, VF	D4, ESF	Loopbacks, major and minor alarms	No	Power supply	Data, voice, video	ADPCM	Byte	Yes	No	$3,270
Micom Communications Corp. **(805) 583-8600**	Instatrunk480 T1 Local Multiplexer	No	1	Point-to-point	19.2K	NA	RS-232	Proprietary	Trunk and channel 1 loopback, diagnostic LEDs	Yes	Common logic, T1 driver, power supply	Data	None	Bit	No	No	$3,200
Network Equipment Technologies, Inc. **(415) 366-4400**	NET IDNX/10 Integrated Access Multiplexer	No	Up to 2	Multipoint	300-16K	1.2K-1.5M	DS1, RS-232, V.35, RS-422/449, T1, 2-wire FXS, FXO, 4-wire E&M	D3/D4, ESF	AT&T 54016 and 62411 (ESF-FDL), V.54 loops, local and remote loopbacks, BERT, self-test, security, alarm reporting, out of frame, major and minor alarms, link outage	Yes	Power supply, PBX/DS1, modem, RS-232, T1 CSU	Data, voice, video	PCM	Byte	Yes	Yes	$7,000-$20,000



"I thought I was hearing things when they said, 'It's not our equipment, but we'll take care of it anyway.'"

"The last time something went wrong with my system, the computer company blamed everybody's equipment except their own.

"Meanwhile, I had people out there gritting their teeth, staring at blank screens.

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VENDOR	PRODUCT	SUPPORTS T3 THROUGH A DIRECT INTERFACE	T1 LINES SUPPORTED	POINT-TO-POINT OR MULTIPOINT	ASYNCHRONOUS SPEED (bit/sec.)	SYNCHRONOUS SPEED (bit/sec.)	INTERFACES SUPPORTED	FRAMING OPTIONS SUPPORTED	DIAGNOSTIC/ALARM FEATURES SUPPORTED	OFFERS SINGLE-POINT NETWORK CONTROL	LEVELS OF REDUNDANCY SUPPORTED	TYPES OF TRANSMISSION	VOICE-COMPRESSION METHODS	BIT OR BYTE INTERLEAVED	DROP AND INSERT CAPABILITIES	AUTOMATIC REROUTING CAPABILITIES	PRICE
Network Equipment Technologies, Inc. **(415) 366-4400**	NET IDNX/20 Transmission Resource Manager	No	15	Multipoint	75-19.2K	1.2K-1.3M	Biphase, CCITT G.703, DS1, HSDS, MIL 188, RS-232, V.35, RS-422/449, T1, X.21	D4, ESF	ESF, V.54 loops, local and remote loopbacks, BERT, self-test, security, alarm reporting, out of frame, major and minor alarms, link outage	Yes	Common equipment, modules, control logic, power supply, trunk, voice module	Data, voice, video	ADPCM, PCM	Byte	Yes	Yes	$20,000-$45,000
	NET IDNX/40 Transmission Resource Manager	No	15	Multipoint	75-19.2K	1.2K-1.3M	Biphase, CCITT G.703, DS1, HSDS, MIL 188, RS-232, V.35, RS-422/449, T1, X.21	D4, ESF	Same as above	Yes	Same as above	Data, voice, video	ADPCM, PCM	Byte	Yes	Yes	$40,000-$65,000
	NET IDNX/70 Transmission Resource Manager	No	96	Multipoint	75-19.2K	1.2K-1.3M	Biphase, CCITT G.703, DS1, HSDS, MIL 188, RS-232, V.35, RS-422/449, T1, X.21	D4, ESF	Same as above	Yes	Same as above	Data, voice, video	ADPCM, PCM	Byte	Yes	Yes	$70,000-$200,000
Newbridge Networks, Inc. **(703) 834-3600**	3600 Bandwidth Manager	Yes	16-32	Multipoint	75-38.4K	2.4K-1.9M	RS-232, RS-449, V.35, X.21	D4, ESF, SDM, X50, proprietary	All standard diagnostics and alarms	Yes	Aggregates, buses, power supply, common logic	Data, voice, video	ADPCM, vector quantization coding, high-capacity voice	Byte	Yes	Yes	$15,000
Northern Telecom, Inc. **(404) 840-5000**	FMT-150	Yes	Up to 84	Multipoint	NA	1.5M	DS1, DS1C, DS2, DS3	None	Remote performance monitoring, inventory, option setting, DS-1 test, E2A, fault location, loopbacks	Yes	Low-/high-speed interface, optics, power supply	Data, voice, video	NA	Bit	Yes	Yes	$17,498
Optical Data Systems **(214) 234-6400**	ODS 700, 704, 708, 730	No	NP	Point-to-point	Up to 19.2K	Up to 64K	NP	DSX-1, D4, ESF	Local and remote loopback, fiber quality and status, loss of synch	No	Power supply	Data, voice	None	Both	No	No	$895
Phoenix Microsystems **(800) 866-8480**	1536 Data to T1 Converter	No	NP	Point-to-point	19.2K	1.5M	MIL 188-114, RS-232, RS-449, V.35	D4, ESF	NP	Yes	Alarm relay control leads	Data, video	NA	NP	No	No	$2,295
Pulsecom Division, Hubbell, Inc. **(703) 471-2950**	T1 Business Bank	No	Up to 2	Point-to-point	75-57.6K	2.4K-1.5M	RS-232, RS-449/423, V.35, 2B+D, DID, DOD, E&M, P-Phone, program channel	AMI/ZCS, B8ZS, ESF, SF	Diagnostic and alarm features to DS-1	Yes	Redundant power	Data, voice, video	ADPCM	Byte	Yes	No	$3,650
Racal-Milgo **(800) 722-2555**	Omnimux 7000 Channel Bank/T1 Multiplexer	No	1	Multipoint	19.2K	1.5M	RS-232, RS-422, V.35, 4-wire E&M	D4, ESF	Auto dial-out on alarm, diagnostics to card level, local and remote loopbacks and diagnostic access reports	No	Power supply	Data, voice, video	None	Byte	Yes	No	$2,853
	Omnimux 8000	No	8 per node	Multipoint	75-19.2K	1.2K-1.5M	RS-232, T1.5, V.35	D4, ESF	Local and remote loopback	Yes	Common logic, aggregate card, CPU, power supply	Data, voice, video	ADPCM, CVSD, PAL 19, PCM	Nibble	Yes	Yes	$22,000
	Omnimux 9000 Networking T1 Multiplexer	No	9	Multipoint	19.2K	1.5M	DSX-1, RS-232, RS-422, V.35, 4-wire E&M	D4, ESF	Diagnostics to card level, local and remote loopbacks, network map, relational database, reports, Sun-based NMS	Yes	Logic, power supply, T1 trunks	Data, voice, video	ADPCM	Byte	Yes	Yes	$20,350
RAD Data Communications **(201) 587-8822**	Megaplex 2000	No	NP	Multipoint	1.2K-19.2K	1.2K-1.5M	CEPT, T1	D4, ESF	Full support of ESF features	Yes	Common logic, link	Data, voice, video	ADPCM	Byte	Yes	Yes	$2,500
Scitec Communication System Limited **(401) 849-4353**	Maxima	No	Up to 16	Both	50-19.2K	100-2M	RS-232, RS-422/499, V.35, G.703	D4, ESF, G.704	Major and minor alarms	Yes	Mainframe and clock cards, trunks	Data, voice, video	ADPCM, PCM, proprietary	Bit	Yes	Yes	$20,000
Spectrum Digital, Division of Telematics International Co. **(703) 478-0560**	DX Wideband Exchange	No	Up to 8	Multipoint	50-19.2K	48K-2M (internode trunk), 1.2K-2M (channel)	RS-232, RS-449/V.11, V.24, V.35, 2-/4-wire E&M (types 1, 2, 3, 4, 5)	D4, ESF, G.732, proprietary autoframe	34 selectable alarms, operator determined major and minor thresholds, bipolar violations, power fail, local and remote loopback	Yes	Common logic	Data, voice, video	ADPCM	Bit	Yes	Yes	$10,000
Stratacom, Inc. **(408) 370-2333**	IPX Bandwidth Manager	No	16	Multipoint	1.2K-19.2K	1.2K-1.3M	RS-232, RS-449, V.35, T1	D4, ESF	AT&T 62411, diagnostics including BERT, major and minor alarms, relay closures/external indicators, local and remote loopbacks, automatic isolator, network alarm	Yes	Total circuit redundancy	Data, voice, video	ADPCM, VAD	Fast-packet	Yes	Yes	$7,500
Telco Systems Network Access Corp. **(800) 227-0937**	Route 24 Intelligent Access Multiplexer	No	1	Point-to-point	Up to 19.2K	Up to 1.5M	RS-232, RS-449/422, V.35	ESF, SF	Digital 1-KHz tone/quiet code/test pattern generator, dial-out modem for alarms, relay contacts for external alarms, loopbacks, major and minor alarms	Yes	None	Data, voice	None	Byte	No	Yes	$3,319
	DCB-24 Digital Channel Bank	No	1	Point-to-point	Up to 19.2K	Up to 1.5M	RS-232, RS-449/422, V.35	ESF, SF	Digital 1-KHz tone/quiet code/test pattern generator, relay contacts for external alarms, loopbacks, major and minor alarms	No	None	Data, voice	None	Byte	No	No	$2,355
Tellabs, Inc. **(708) 969-8800**	Crossnet Networking System	No	NP	Both	300-19.2K	1.2K-1.3M	AMI, B8ZS, MIL 188-114, RS-232, RS-444/423, V.35 4-wire E&M, 2-wire FXO/FXS, DX, SF	D4, ESF	NP	Yes	All common logic, critical component, power supply	Data, voice, video	ADPCM	Both	Yes	Yes	NP

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Teltrend, Inc. (800) 835-8736	MAX1 Model M-826	No	2	Multipoint	50-19.2K	1.2K-1.5M	RS-232, RS-449, V.35, 2-/4-wire E&M	D4, ESF	Audible major and minor alarms	Yes	CPU, power supply, T1 interface	Data, voice, video	ADPCM	Byte	Yes	Yes	$8,125
Timeplex, Inc. (201) 391-1111	Minilink/2 ICS	No	Up to 10	Multipoint	45.5-19.2K	50-1.5M	CCITT G.703/704, V.35, DSX-1, MIL 188-114, RS-232/V.24, RS-422/V.11, 2-/4-wire E&M	D4	Configuration, control, monitoring, alarm reporting, tests and diagnostics	Yes	Common logic, power supply, trunks	Data, voice, video	ADPCM, CVSD, proprietary	Byte	Yes	Yes	NP
	Link/2 ICS	No	Up to 12	Multipoint	45.5-19.2K	50-1.5M	CCITT G.703/704, V.35, DSX-1, MIL 188-114, RS-232/V.24, RS-422/V.11, 2-/4-wire E&M	D4	Same as above	Yes	Same as above	Data, voice, video	ADPCM, CVSD, proprietary	Byte	Yes	Yes	NP
	Microlink/2 ICS	No	2	Multipoint	45.5-19.2K	50-1.5M	CCITT G.703/704, V.35, DSX-1, MIL 188-114, RS-232/V.24, RS-422/V.11, 2-/4-wire E&M	D4	Same as above	Yes	Same as above	Data, voice, video	ADPCM, CVSD, proprietary	Byte	Yes	Yes	NP
	Link/100 ICS	No	28	Multipoint	45.5-19.2K	50-1.5M	CCITT G.703/704, V.35, DSX-1, RS-422/V.11	D4	Same as above	Yes	Same as above	Data, voice, video	ADPCM, CVSD, proprietary	Byte	Yes	Yes	NP
Telecommunications Technology, Inc. (408) 945-1705	T1 CPE Intelligent Mux	No	2	Multipoint	64K	64K	RS-232, V.35	ESF, D4	Open architecture	Yes	Line interface	Data	ADPCM	Bit	Yes	Yes	NP

When a modem isn't really a modem

ADC/Kentrox, INC and Case/Datatel serve digital networks with DSUs

BY RICHARD THOMA

What comes after the modem? The logical successor is the digital service unit/channel service unit (DSU/CSU). When, as eventually will happen, all networks become digital, the need for modulation and demodulation will disappear altogether and everyone will be able to make use of simpler and cheaper digital interface units. That day is not quite here, but one type of DSU/CSU that promises some immediate benefits is the 56K bit/sec. unit.

What these units offer to a corporate user is the ability to make large data transfers at voice prices. They accomplish this by using a T1 or Digital Data Service (DDS) line for connection to the data services offered by interexchange carriers over their existing voice networks. Equipped with built-in autodial capability, the DSU/CSU generates a 2,100-Hz clearing tone that alerts the carriers to remove the echo suppression they have in place for voice equipment and route the transmission away from any analog lines.

To get an idea of the economies involved, consider that 56K bit/sec., which is the lowest DSU/CSU capacity available and corresponds to the data-handling capacity of the carriers' digital voice channels, is 10 times faster in terms of absolute throughput than the fastest standard analog modems (9.6K bit/sec).

Savings will become even more pronounced with the arrival of more innovations. For instance, vendors are promising to enhance DSU/CSUs so that they can work with a two-wire instead of a four-wire digital interface.

PRODUCT FACE-OFF

This would eliminate the need to invest in a DDS line if T1 service does not terminate in the user's facility; it would also help to prepare the ground for connection to carrier networks through central office local-area networks. Fractional T1 services, offered by a number of interexchange carriers and promised by all of the Bell operating companies, can also eliminate the need to invest in a T1 line.

The three leading providers of this new class of DSU/CSU equipment are ADC/Kentrox, with its Kentrox Tie Link 56, Integrated Network Corp.'s (INC) 1056 Switched Channel Data Service Unit and Case/Datatel, Inc., with its DCP3056 Switched 56 Terminal Interface Unit.

The price leader is Kentrox's Desktop Tie Link 56, which sells for $1,795. This product, an autodial/autoanswer DSU/CSU for four-wire switched 56K bit/sec. services, includes all the features of Kentrox's rack-mounted model in a desktop package for applications such as PC-to-PC transfer, Group 4 facsimile, video teleconferencing, encrypted voice and data, bulk data transfer and computer-aided engineering, design and manufacturing.

Tie Link 56 includes an industry-standard AT command set, as used in all Hayes-compatible modems, and provides a backlit display for easy reading. A patented 2,100-Hz tone turns off echo cancelers and maximizes synchronization through incremental shifts of tonal range. Built-in diagnostics perform tests without external equipment, and call-progress displays provide data on call status.

The one area where Tie Link 56 falls short of the competition is its lack of an A/B switch and autobaud facilities, which limits its ability to perform specific port configurations.

INC's 1056E Switched Channel Data Service Unit, priced at $2,250, provides high-speed 56K bit/sec. data transmission in either switched or dedicated mode. If the DDS line fails, the equipment can automatically convert to switched operation. It also offers powerful operational and diagnostic features.

The 1056E has combined DSU/CSU and dialing functions and an A/B switch for automatic dial backup on dedicated-line applications. An echo cancel disabler is available for use on networks that carry voice and data. The front panel includes a 40-character, two-line multifunction LCD and eight LED status indicators. Remote operation is also possible via a control port.

Automatic drop and retry is provided for unanswered calls. The INC 1056E offers extensive diagnostic capabilities, such as a test generator, error checker and bit-error tests, six loopback tests and three user- and network-initiated tests.

Memory dialing is available for 25 numbers; the 1056E offers both last-number redial and nonvolatile storage for phone numbers. It is compatible with U.S. Sprint Communications Co.'s TS-046 specification, which has become the de facto standard for data services over voice lines.

For an additional $395, INC offers a subrate data converter capable of providing synchronous and asynchronous data terminal equipment speeds up to 19.2K bit/sec., speed selection and loopback test initiation. Two units per connection are required, but this equipment will operate with other vendors' switched 56K bit/sec. units.

Both units provide an adequate solution. Neither product, however, offers the command interface versatility or the autospeed conversion of Case/Datatel's DCP3056 Switched 56 Terminal Interface Unit.

The DCP3056 has a 100-number dialing capability and a speed-conversion facility for line rates of 2,400, 4.8K, 9.6K and 19.2K bit/sec. in its 56K bit/sec. channel. It has complete call-monitoring and diagnostic capability and complies with Sprint's TS-046. Sprint has also certified the product's compliance.

Case/Datatel was the first of the three companies to provide A/B switch capability. It supports both front-panel programming and a console-to-CRT interface. The DCP3056 has a seven-position shift in the 2,100-Hz data stream to ensure the removal of echo cancellation.

The DCP3056 Switched 56 Terminal Interface Unit, which sells for $1,950, provides an RS-232 and V.35 interface on both sides of the A/B switch, RS-366 and RS-232 command interfaces and a printer interface.

These products represent just the first wave. All three vendors plan to introduce new models in the first quarter of 1990, and others are jumping in with offerings of their own. In fact, Northern Telecom reports that it has now licensed its two-wire technology to 18 vendors. ●

Thoma is president of Thoma Associates, a Philadelphia-based consulting firm specializing in strategic planning for computers and communications.

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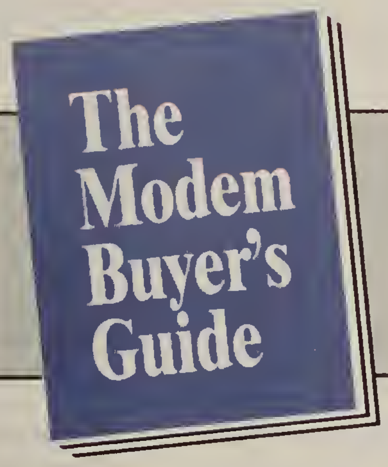
Typical throughput	30,000 bps	17,000 bps	12,000 bps
MNP Class	9	5	10
Modulation standards	CCITT V.32, V.22bis, Bell 212A, 103	CCITT V.32, V.22bis Bell 212A, 103	V.22bis Bell 212A, 103
100% error free	Yes	Yes	Yes
UUCP Protocol Support (UNIX)	No	Yes	No
Kermit Protocol Support	No	Yes	No
Remote Access	Yes	Yes	Yes
MNP Password Connection Security	No	Yes	Yes
Price	$1,599	$1,199	$699



The Modem Buyer's Guide

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A dial-up plan battens down the hatches

BY BARBARA SEHR

Fiserv, Inc. probably felt pretty secure when this fall's wave of disasters struck.

The Milwaukee-based company, a data processing service bureau with 20 data centers that serve financial institutions across the country, had tested a disaster-recovery scheme based on backup dial-up transmission and a high-end modem long before the first winds of Hurricane Hugo began to blow.

It had to be ready. In July, the U.S. Office of Regulatory Activities established guidelines for contingency planning at financial institutions. The guidelines are intended to minimize financial loss and disruption of service and ensure timely resumption of operations in the event of a natural disaster, technical failure or human disruption, such as sabotage.

Since many savings and loans rely heavily on service bureaus for data processing, the bureaus are required to comply with the guidelines as well.

Although Fiserv has had recovery plans in place since its inception, "to remain in compliance with the updated and revised guidelines, the company has strengthened and formalized its plan," according to Michael Rigney, vice-president of operations at the company's Tampa, Fla., data center.

Fiserv handles records for 19 million accounts at over 800 credit unions, savings and loans and commercial banks. When conditions are normal, each client location's terminal equipment interfaces with the host front-end processor and mainframe via multidrop leased lines.

The data centers employ a variety of mainframes, including machines from IBM, Unisys Corp. and NCR Corp.

In formalizing its contingency plan, Fiserv had two requirements besides satisfying federal regulators. One was cost containment.

"The disaster-recovery process must remain as affordable as possible so that both the client and the data center can afford to implement the plan properly," Rigney says.

Planning for obsolescence

In addition, Rigney says he believes that any technology selected is likely to be obsolete in three years. "So, your best bet is to look for the best business-resumption technique for the least dollar investment so you're in a position to adapt to new technology as it comes along," he explains.

The second concern was flexibility. Because each bureau's clients transmit at different line speeds and use various data formats and terminal interfaces, the eventual plan would need to accommodate these variables.

> "THE DISASTER-recovery process must remain as affordable as possible so that both the client and the data center can afford to implement the plan properly."
>
> MICHAEL RIGNEY
> FISERV

Having established these requirements, Fiserv piloted a contingency plan at its Tampa service bureau in July that met its needs exactly.

The plan has two components. Clients are given the option of a backup line that is dial-up rather than multidrop leased, and a limited replica of the client's configuration is set up at the primary data center. In the event of a failure at its own site, the client can switch to dial-up and continue operations at the data center.

The second part of the plan covers interruptions that may occur at the primary data center.

In these cases, equipment is set up at a recovery center that is able to support all data center critical applications. The client can dial up the hot site and resume its operations there.

Obstacle course

Fiserv had to overcome two complications before the plan would work. Once transmission went from multidrop leased to dial-up lines, each location on the multidrop circuit became point-to-point service.

That is, instead of having one front-end processor line interface accept transmission from all the locations on the multidrop line, it needed one line interface for each client on the line. If there were five locations on one multidrop line, this could turn into a lot of front-end processor boards.

Networks, Inc., a systems integrator in Miami Lakes, Fla., helped Fiserv locate its solution. A programmable digital bridge reconcentrates the point-to-point dial-up circuits into a balanced

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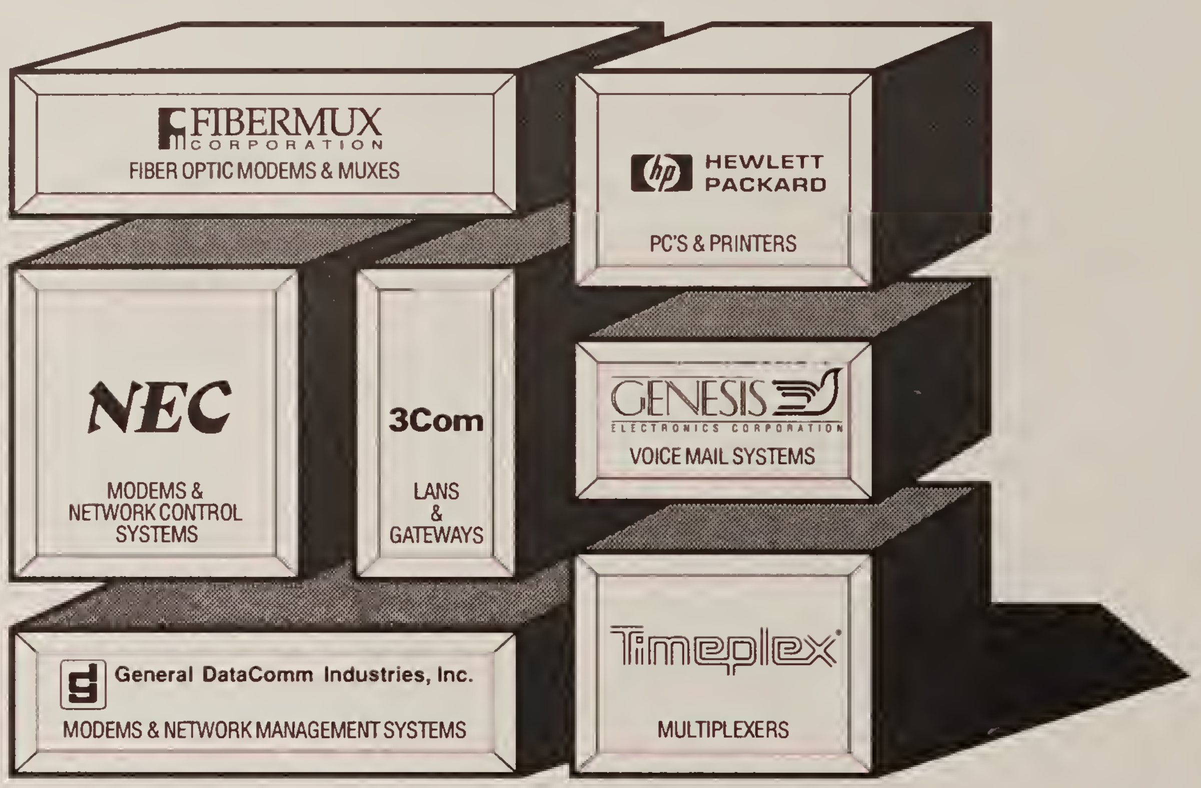
Sehr is a free-lance writer based in Hayward, Calif.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configuration of simulated multidrop circuits, minimizing the number of front-end processor interfaces. Suddenly, dial-up transmission was practical for what is a very large network configuration.

The second complication was finding one modem that was flexible enough to accept each client's transmission format. The right modem for the job was one from NEC Corp. — its 9631 V.32 model.

At $1,095, the 9631 was the only single-call, multispeed dial-up modem available at the time of the spring 1989 implementation. Two others were in development at the time, but they were not available.

The NEC modem accommodates any line speed from 1,200 to 9.6K bit/sec. in synchronous, asynchronous or isochronous mode. In other words, it accepts any type of signal and can also be reconfigured to accommodate changes in the client's setup. More importantly, the 9631 was the only modem at the time that could pass the control signal used with digital bridging.

Load 'em with modems

Fiserv purchased a 9631 modem to be placed at each client site. For each site served by the data center, there is a corresponding modem available at the recovery center.

Another advantage of the modem's flexibility is that because it can accept such a wide range of transmission types, the number of modems the hot site needs equals the maximum number of clients served by a particular data center. Each recovery site serves more than one primary data center, and the modems that accept transmission from one data center's clients can be configured to accept transmission from another.

Four data centers besides the Tampa site — San Antonio, Los Angeles, Seattle and Fiserv's headquarters in Milwaukee — are using this system. All five are Unisys sites. Two recovery centers — in Milwaukee and Warminster, Pa. — serve all five locations. The hot sites are located far enough away from the data centers that no single disruption could threaten both the hot site and a given data center.

As for the other 15, corporate policy mandates that each data center have a backup plan in existence that meets federal regulations. But because of the diversity of systems, each is given the freedom to come up with its own plan. Currently, all have a plan under evaluation.

By using dial-up lines, the 9631 modem and a digital bridge, Fiserv kept the cost of implementing the system to $1 million. Furthermore, there is little risk of obsolescence. "Dial-up offers a ramped solution," Rigney says. "And we have not compromised in cost or in effectiveness."

Rigney says he believes the multispeed, single-call dial-up concept employed in the NEC modem will become more common as other institutions prepare disaster recovery plans. Because of its flexibility and minor investment, he says, "I believe it will play a major role in disaster recovery." •

ASK THE VENDOR

Will Fastcomm's FDX 9696 modem work right out of the box? If not, how hard is it to configure?

David Lanning
Programmer/Analyst
Technology Management Corp.
Alexandria, Va.

FASTCOMM COMMUNICATIONS CORP.: The FDX 9696 is configured to work "right out of the box" with asynchronous dial-up applications. The product, which is a V.32 modem, has been designed to talk to all modems at 9.6K, 2,400, 1,200 or 300 bit/sec. automatically.

The modem plugs and plays without changing the options. The customer simply sets his terminal, personal computer or workstation at 9.6K bit/sec. and issues an AT command. This will automatically connect to the modem that it calls.

Any changes in and out of the box settings can be done remotely without sending someone to the other locations.

We use several VDS modems, including the V.3225 and wonder what significance the V.42bis standard has in the communications marketplace and how quickly will it be accepted by modem users?

Terry Graves
Manager of Field Services
Compuserve
Columbus, Ohio

UNIVERSAL DATA SYSTEMS (UDS): V.42bis is the new CCITT international standard for data compression and is just now beginning to appear in some modems. This algorithm is more powerful than other data-compression schemes and, when used on the UDS V.3225 9.6K bit/sec. modem or any V.32 9.6K bit/sec. modem, it will allow data rates up to 38.4K bit/sec. over standard dial-up networks.

How quickly the new standard will be accepted probably depends on how quickly the major modem vendors release new products that include V.42bis. If these products begin to appear in large production quantities in early 1990, then we can expect the standard to be widespread by the end of that year.

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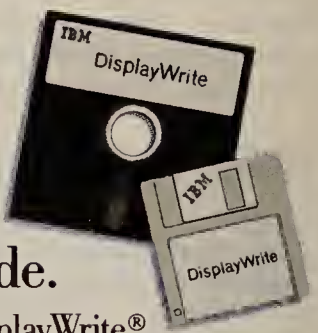

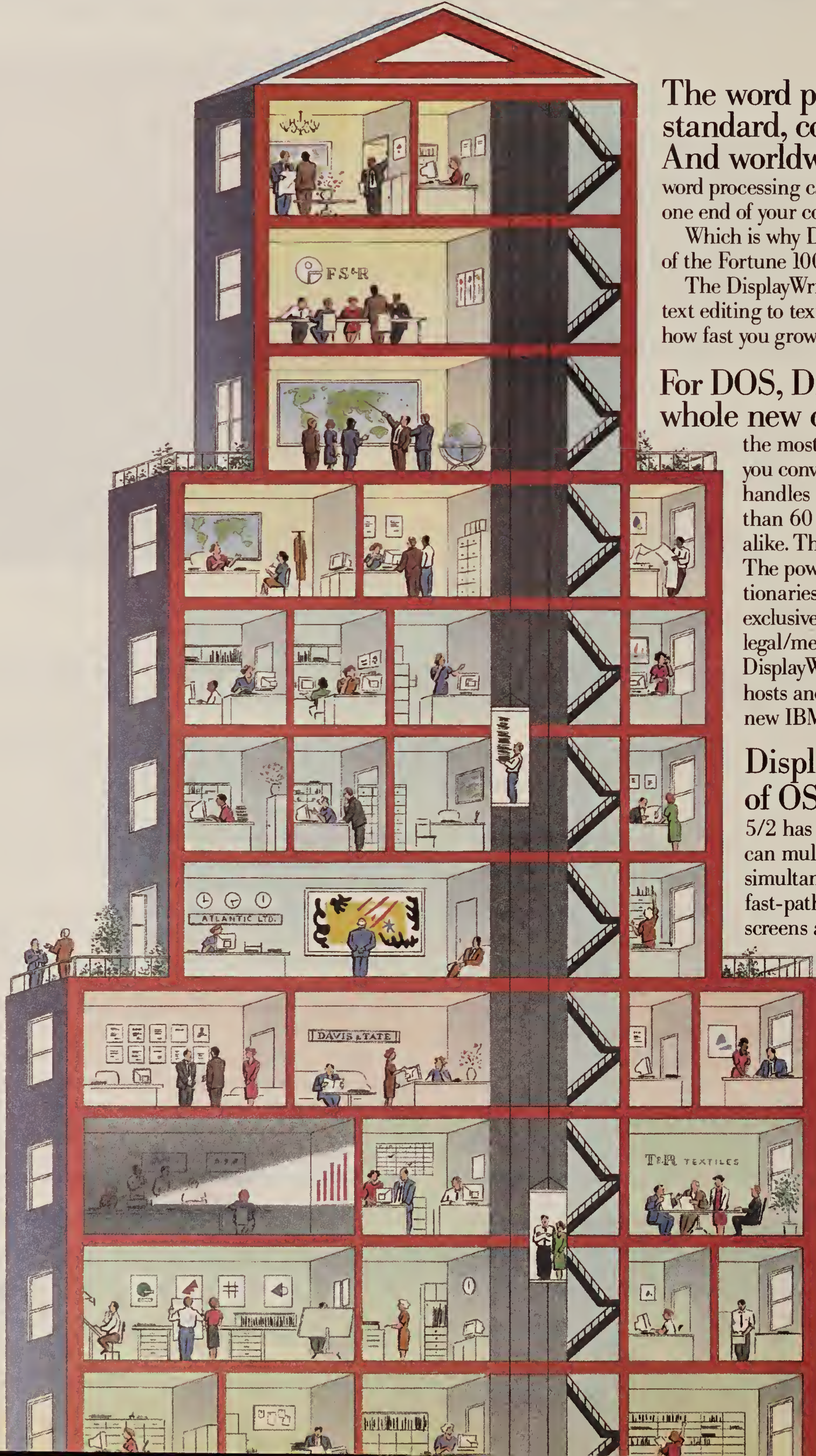

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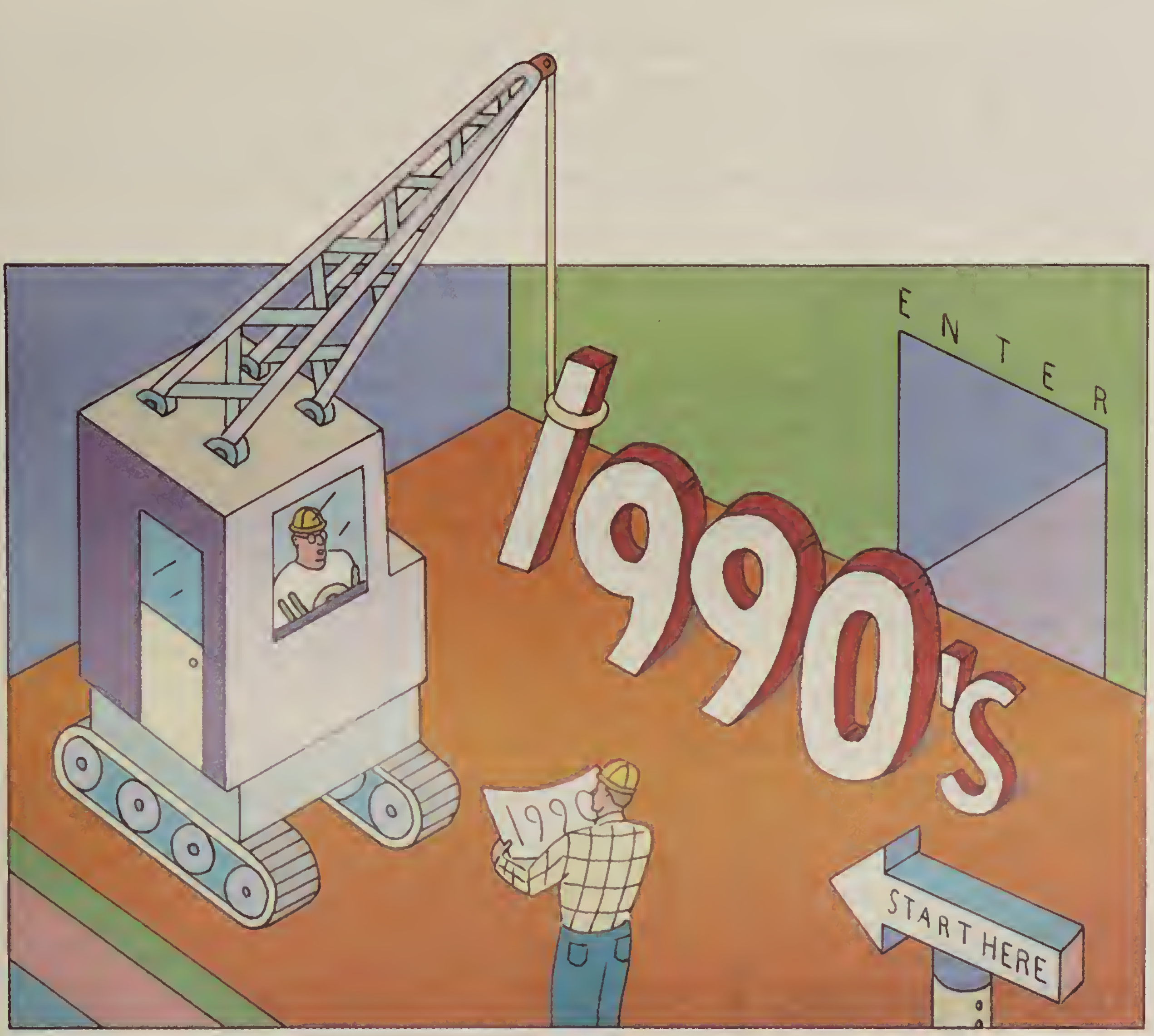
Shaping the 1990s

A new way of looking at the future helps industry participants develop their visions of the next five years



STEPHEN TURK

BY JAMES HERMAN,
PATRICIA SEYBOLD
and ROBERT WEBER

All of us in the computer industry, leaders of giant corporations or garage-shop inventors work with a vision of how we think people will use computers and communications in the 1990s.

Will end-user computing dominate? Will mainframes stage a comeback? Some of us worry about which technologies will succeed. Is broadband Integrated Services Digital Network the wave of the future? Will desktop video be commonplace? Others worry about how to make money in an industry increasingly ruled by standards. Will consolidation lead us to an end game with only a few big players? Will users be able to integrate technology from multiple vendors or will they keep buying from a few strategic vendors? Everyone wants to know what will happen and how to best take advantage of the way things turn out.

As the decade turns, it is a good time to start thinking differently about the future. Calvin was wrong. The future is not predetermined; it is shaped by the choices and actions of industry participants.

Five visions of tomorrow

In defining a vision of tomorrow, many people construct a "most-likely" scenario or assign probabilities of success to particular companies or strategies. Unfortunately, there is an increasing danger of being blindsided by an unexpected turn of events — which is often more important in the computer industry than the statistically valid forecasts of research firms. It is much more useful to work with a number of alternative future industry configurations, each of which is technologically plausible and makes good business sense.

A new way of learning about the future flows from working with five alternative visions or "end states" of what the computer and communications industry will look like by the middle of the new decade: A future dominated by standards, a future driven by a new technology, a future belonging to networking, an affordable future and a future owned by big players (see story page 79).

These visions are not mutually exclusive; they share many common characteristics. But each clearly depicts a radically different competitive environment for the middle of the decade. Vendors, users and government would behave differently in each. Which vision is right or most likely to occur? That may be the wrong question to ask. A better approach may be to determine how actions and choices by industry players can influence the evolution of the industry, so that it moves toward one of the end states.

Events vs. trends

This new approach to working with the future provides a very different focus from "sustainable competitive advantages" and similar strategic planning concepts. There is no sustainable competitive advantage, but rather, a neverending series of challenges. The goal for executives, managers, inventors and planners, then, is to stay one or more steps ahead of their competitors at all times. Doing so requires knowing what is important and what is not, what should be changed and what should not, and perhaps most important, when to make changes.

The key questions to be explored are those that suggest the

Herman is principal of Northeast Consulting Resources, Inc. Seybold is president of the Seybold Office Computing Group. Weber is a senior consultant at Harvard University.

- **'Calvin was wrong'**
- **Not one vision but a mix of several**
- **Identifying key steps is important**

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way your organization can influence the outcome. Such questions can be best addressed in several ways: by focusing on events rather than trends, by underscoring the many possibilities rather than considering a few trends and outcomes and by identifying which key events must happen if a particular vision is to be achieved.

> THE GOAL for executives, managers, inventors and planners, then, is to stay one or more steps ahead of their competitors at all times.

In order to succeed, you must find the key points of leverage that will push the industry down one pathway or another. By looking at a full set of alternative future scenarios, you can track the trajectory of the industry toward one end state or another and over time, refine the set of assumptions that guides your planning.

Most successful managers and executives work within a mental context founded on two visions. The first is a complete, holistic view of the industry and its dynamics, which lets them communicate a vision of how company or project team activities fit into the bigger picture. The second is a detailed mental model for planning key tasks and tracking external developments. This structure provides a framework for making decisions and redirecting effort.

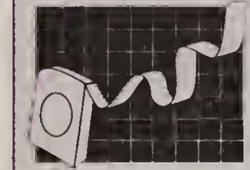
You can establish your goals and objectives against a complete set of alternatives and more accurately target the actions necessary to create a climate favorable to your strategy. The result can be a very robust foundation for planning and strategy that can encompass, rather than avoid, the true complexity of your industry. Decision makers can then use this information with company missions, resources, goals and strategies to develop more realistic and attainable technology and business objectives.

Players in the information technology industry divide into two types: The first waits to work with whatever develops, while the second deliberately chooses a particular outcome for the industry and works skillfully to ensure it develops that way. It is this second group — those with a coherent image of the computer and communications industry future — whose dreams and reasoning can tell a lot about the evolution of the industry during the early 1990s.

Future by objectives

During the past 1½ years, we have led diverse groups of industry thinkers and doers through two-day programs and exercises that let them consider divergent possible futures and how to make them happen. The program is multidisciplinary and draws on diverse participants from all sectors of industry, including technology, business, government and education. We have begun to record and preserve some

Five visions of the future

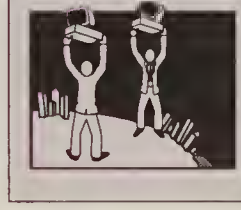


- **A future dominated by standards.** Proprietary standards have faded, replaced by practical and more popular, uniform, multivendor solutions. The need for compatibility with installed base slows technological advances, though. Open market prices are lower, with keen competition in application software. Biggest advantages go to small, responsive firms or large, volume producers. Far East gains world momentum at the expense of IBM.

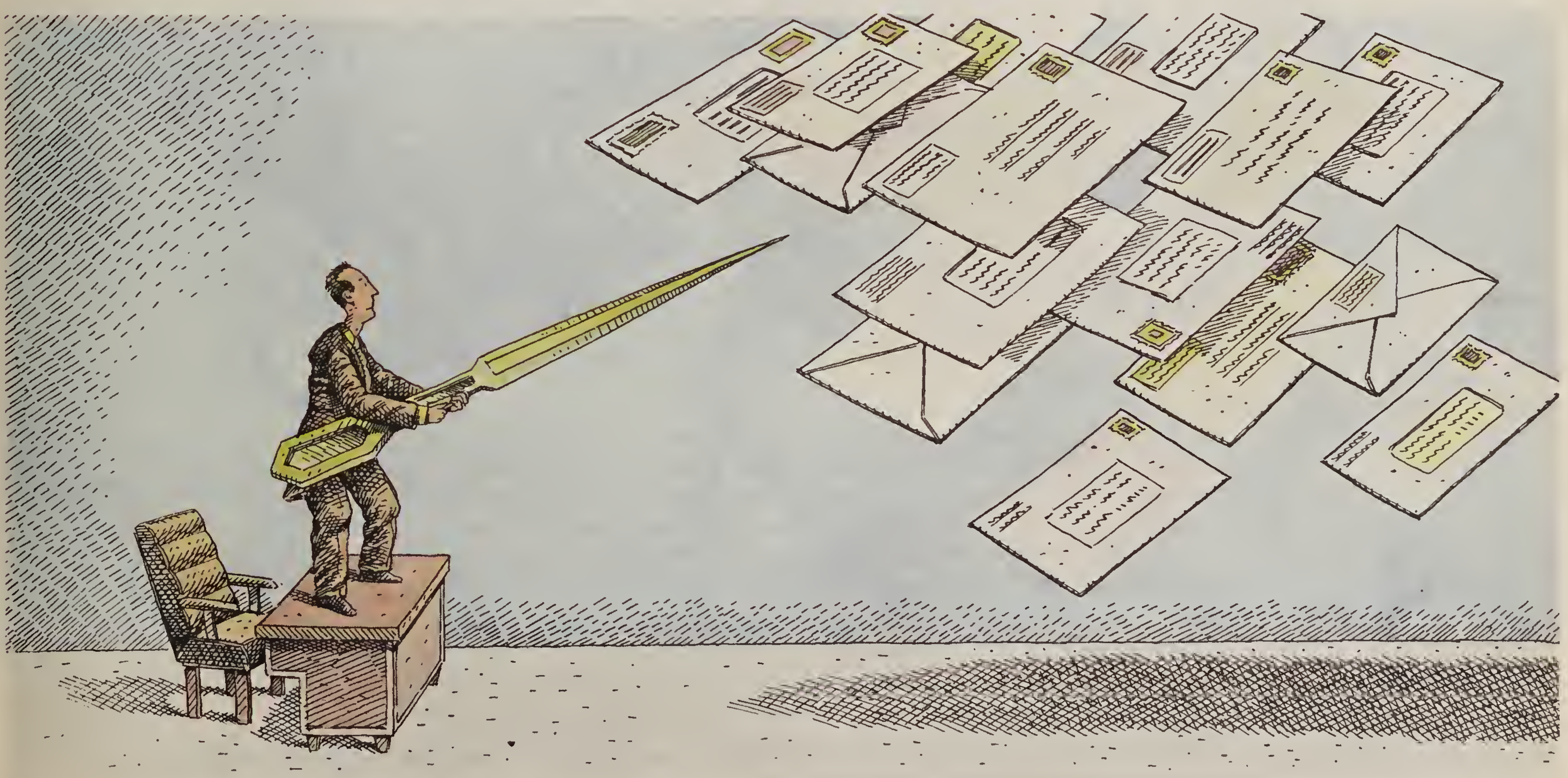
- **A future driven by new technology.** Advances continue into seventh year. Flat screens, speech recognition, image processing, superb color, expert assistants and multimedia documents redefine user interaction. Fiber-optic speeds image transmission, while parallel processing and new architectures sharply boost performance. Aggressive start-ups fuel innovation; big vendors bog down supporting existing base.

- **A future belonging to networking.** Use of discrete computers fades, as networked machines become distributed parallel processors. Location-independent data access and cooperative processing are major software paradigms. Groupware is popular. Small firms use global marketplace for IS.

- **An affordable future.** Technology spending lags, as users rethink investments. Economic logic of moving to inexpensive distributed platforms is inescapable. End-user applications are the most popular new applications. Economies of scale and good distribution are keys to success. Global stagnation fuels fierce nationalistic pride.



- **A future owned by big players.** Intense consolidation narrows number of broad-line information suppliers to six large multinational giants. Need for high return on R&D investment fuels proprietary approaches, yielding better technology, integration and functionality. Users prefer packaged solutions, centrally developed mission-critical systems. Vendors have power over suppliers and customers and raise high barriers to entry.



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Despite 3990 delays, IBM's high-end storage controller wins early user endorsements. Page 27.

Court: States may tax net traffic

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A U.S. Supreme Court ruling last week will allow states to tax interstate voice and data traffic.

With several states having already enacted such taxes and others desperately seeking new sources of revenue, the decision could raise the cost of business communications and affect the location of data centers.

The decision upheld an Illinois law imposing a 5% excise tax on interstate voice and data transmissions that begin or end in the state. Approximately a dozen states have similar taxes, and more states are expected to follow suit.

Axed with taxes
Illinois collected $142 million in taxes by mid-1987 and continues to collect revenue at a rate of $10 million per month from business and residential users, according to a court filing.

Business network managers, especially those with high-volume transaction networks such as airline reservation systems, may wind up moving their data centers to "tax haven" states that do not impose telecommunications taxes, according to experts.

"This will definitely affect site-location decisions," said Kenneth L. Phillips, vice-president of telecommunications policy at Citicorp in New York and chairman of the Committee of

Continued on page 16

Revenue enhancers
A dozen states already have some form of tax on interstate telecommunications, and more are expected to follow as a result of last week's green light from the U.S. Supreme Court

NAS deal brings new lineup to plug-compatible market

BY JEAN S. BOZMAN
and CLINTON WILDER
CW STAFF

SANTA CLARA, Calif. — Months of uncertainty for users of National Advanced Systems CPUs came to an end last week with National Semiconductor Corp.'s sale of 50% of its mainframe unit to Memorex Telex N.V.

After dozens of rumors about the potential sale, the deal — a total package estimated at between $300 million and $350 million — appears to guarantee continuity for customers, at least in the near term. NAS management will stay in place, and no work force reductions are anticipated, a NAS spokeswoman said. But with Memorex Telex obtaining an option to buy out all of National Semiconductor's stake at an unspecified future date, further changes could occur.

"National obviously is headed in a different direction than they were before, but we're encouraged that they kept half the company," said Richard Lester, vice-president of corporate development at Seattle-based Associated Grocers, Inc., which runs a NAS AS/XL 60 and 90/60. "We've done business with Memorex [for several years], and we're very comfortable with them."

Continued on page 8

On SQL Server's test trail

BY DOUGLAS BARNEY
CW STAFF

A glaring shortage of front-end development tools and the lack of a finished product has not stopped a handful of the U.S.' largest corporations from hatching SQL Server applications.

SQL Server, announced one year ago by Ashton-Tate Corp., Microsoft Corp. and Sybase, Inc., is a multiuser database engine designed for the OS/2 operating system.

It implements the so-called client/server architecture, under which a server handles data management while users' workstations provide the interface or front end.

Users who are anxious to get cracking have been forced to buy the $1,995 Network Development Kit, which is essentially a beta-test version of the software.

Of the 800 units sold, some 200 to 250 have been snapped up by corporations, according to Microsoft SQL Server product manager Dave Kaplan.

System One Airplane Services, a subsidiary of Texas Air Corp., already has a prototype application running under SQL Server, and the results are promising. Curt L. Abraham,

Continued on page 6

Chip prices drop; PC prices don't

BY WILLIAM BRANDEL
CW STAFF

While several vendors used memory costs as an excuse to hike personal computer prices last year, no one is yet promising to bring them down now that the shortage is over.

According to memory-card product vendors and industry analysts, dynamic random-access memory chips are now increasingly available, and prices are dropping. Prices of 1M-bit chips are projected to plummet more than 50% by year's end.

Already, the volume purchase price of 1M-bit chips has dropped to less than $20 per chip. When the memory crisis peaked in June, the price hovered at $50 to $60. Semiconductor price trackers now project that chip prices will fall below $10 this year.

But vendors that raised system prices during the dearth — including Apple Computer, Inc.,

Continued on page 113

When the chips come down
With availability increasing, the price for 1M-bit memory chips has dropped slightly in recent months and is expected to plummet

	256K-bit	1M-bit
Nov. '88	$3.85	$18.75
Dec. '88	$3.85	$18.25
Q1 '89 projected	$3.50	$15.75
Q4 '89 projected	$2.38	$8.64

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* The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."
* The Adams Co. (1988) — "Information Systems Management Study."

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of these visions and the elements of a structure that can support planning to reach the vision (see stories at right and on page 83).

This study is valuable for two reasons: First, the results show what a highly intelligent cross-section of professionals think the computer and communications industry will look like in 1995. Second and more important, the structured process they used to arrive at their conclusions suggests a powerful new way for all industry participants to take a more active role in shaping the last decade of the 20th century.

One way to look at this future-shaping process is to compare it to a time-tested business concept: management by objective. The process of industry participants actively shaping tomorrow's industry may be thought of as "future by objective." The best way to understand the whole process by which this is accomplished is to understand the individual steps and terms.

Many approaches to strategic planning or forecasting are based on informed guesses about existing trends that will play out in the future.

Trend-based forecasting is often wrong, especially more than one or two quarters ahead, let alone five years into the future. The reason is that most forecasters and their clients are not interested in (or able to grasp) key events and their sequences.

End states are brief snapshots of the industry in 1995, a useful time horizon that can be grasped now. They are not random guesses about the future of technology but instead reflect a rigorous approach to the problem of forecasting the state of technology several years into the future. These possible futures are not mutually exclusive: the industry in 1995 is likely to reflect some mix of these end states rather than just one. Still, it is useful to think of end states as separate and distinct outcomes.

These end states seem very familiar. The reason is that they reflect popular mental models, images and beliefs often heard in discussions of the future of the industry. What we have done is to make these widely held visions more precise and internally consistent.

ESTABLISH YOUR GOALS and objectives against a complete set of alternatives and more accurately target the actions necessary to create a climate favorable to your strategy.

End states develop as a consequence of many individual events. (The term "event" is used in a special way here. In this context, an event has three main components: a title or brief summary, a date by which the event is to have happened and a more detailed description.) Events were chosen that capture possible

How the exercise works

- **Teams are formed.** Each team is asked to review the event set and determine which of the 200 or so events were highly likely to occur by 1995. Participants see the five end states before the seminar but not individual events.
- **"Highly likely/unlikely" events are chosen.** Participants are asked to identify events they believe are highly unlikely to happen. There are three reasons for this: the first is to familiarize the participants with the universe of choices. The second is to promote the exchange of opinions and ideas. The third is to explicate the assumptions or biases of the players. The selections reflect what each group predicts will and will not happen.
- **"Must happen/must not happen" events are chosen.** Now that the team members know each other's opinions, teams begin the first of two primary tasks: reviewing the entire set and deciding which events must occur for their end state to actually happen. Teams are then asked to decide which events must not happen if their end state is to become reality.
- **A scenario is developed.** In this second main task, teams link the events that must or must not happen to achieve the final end state. A scenario is a story or narrative that describes sequences of events. The scenario explains the group's judgment and thus also explains why other end states are less likely to occur.
- **Ideas are presented to other groups.** The exercise ends with presentations to the entire seminar by each group. Teams describe events key to their end state and present their narrative. Hearing five reasoned — and passionately defended — scenarios gives everyone a wider view of the possibilities.
- **Key events are tabulated.** During presentations, team votes on key events are quickly tabulated. Afterward, players are shown this list of critical events. "Must and must not" events are shown separately. Interestingly, most events have an application or technology user focus. For example, two of the events are concerned with multivendor, heterogeneous platforms for distributed database applications. The signposts of change in this industry are the things that are done with information technology. By paying attention to the evolution of applications and uses of technology, industry directions become clearer.
- **Key events are compared.** A key advantage of working with distinct events rather than trends is that besides being stories with actors and outcomes, scenarios become sequences of events. This means that lists can be compared and key-event sequences developed by each team using a "cross-futures" analysis.

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turning points in technology, industry structure, government regulation and socioeconomic context.

Another important aspect of events is that they can be influenced by industry participants, including senior executives, managers, inventors and planners.

One example of an event is IBM breaking into four companies — clearly an industry-shaking possibility. Events are logical possibilities, not forecasts about the future. Events are also discrete; they are not processes or trends.

For example, the "declining cost of computing power" is well known and indisputable. However, better price/performance is a trend, not an event. But the existence of "100 million instruction set computing workstations on the desktop" in 1992 is an event that reflects this trend.

> USERS APPEAR to be awakening to find themselves with new options because of standards and a huge, under-utilized installed base that allows them to defer new purchases.

The discussions and choices of team members can be used in several ways:

- **Identifying critical events.** The simplest comparison is of events selected by several teams. Because a majority of teams found these events pivotal to their scenarios, they represent a broad consensus on what the critical developments will be over the next few years.

These events could also be particularly useful in developing vendor product strategies or user information systems architectures.

- **Tracking progress toward end states.** One way that planners and analysts can use events is to monitor progress toward particular end states. A good real-life example occurred recently.

A few months after a June seminar, it was announced in September that 21 networking, computer and software vendors had joined together to support a common platform for creating distributed computer applications. The coalition will let software developers more easily create client/server applications, which would extend over a wide range of network environments and computer operating systems.

The move was an effort to establish a transport-independent remote procedure call (RPC) standard for OSF. The announcement concludes that a second wave of supporters is expected to hit soon because many large organizations tend to take a while to decide on such endorsements.

With many activities and alliances occurring in the industry, knowing which will reshape the competitive dynamic is difficult. Our research suggests that RPC effort is critical and may be a catalyst for

The results . . .

1989:
Highly likely:
- Minicomputers used as servers
- Reusable optical discs common

Highly unlikely:
- Merger of Unix International and OSF
- Increased government R&D
- IBM reduces mainframe margins by 40%

1990
Likely:
- Mainframes still key in database management
- European Postal Telephone and Telegraph restrictions lifted
- Scrutiny tightened on corporate IS purchases

Unlikely:
- Unions oppose more automation
- DEC buys Wang and DG

1991
Likely:
- Critical shortage of clerical workers
- Interoperable products clarified
- OS/2 too expensive

1992
Likely:
- Proliferation of distributed, object-oriented tools
- Specialized servers abound
- True distributed DBMSs available
- European Economic Community unification implemented
- New privacy legislation enacted

1993
Likely:
- Low-cost, high-resolution flat-color screens appear
- Fiber-optic cable cheaper than copper wire

Unlikely:
- Large vendors stop charging for hardware

1994
Likely:
- Embedded computers common

Unlikely:
- DOS declared dead
- IBM limits equipment sales

1995
Likely:
- Digital libraries catch on
- Integrated voice/data terminals replace computers

Unlikely:
- AT&T re-regulated
- IBM broken into four firms

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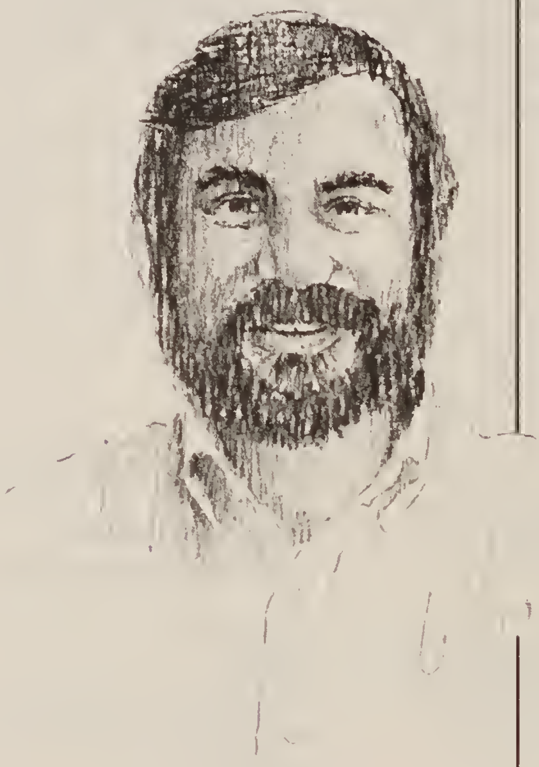

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cfSOFTWARE

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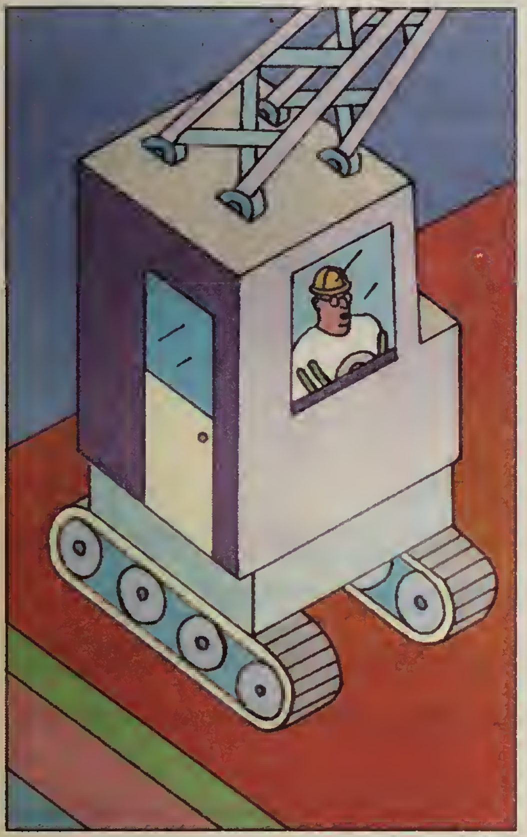
structural change. If your company has not yet figured out its position on this issue, it is time to devise one.

- **Identifying popular topic areas.** Another way to work with the results of the scenario-building effort is to identify topic areas that got the highest reaction from teams. Our results showed the importance of data communications technology and standards.

User decision-making events also attracted many votes. During the seminars, there was much discussion of what the users wanted and what they would do. The exercises provided a focus group in which vendors and users could exchange views. Users appear to be awakening to find themselves with new options because of standards and a huge, underutilized installed base that allows them to defer new purchases.



- **Examine specific issues.** Participants receive a full listing of the voting on all events as part of a results package that is sent a few days after the seminar. Working with a detailed event list allows them to examine specific issues.
- **Establish a monitoring system.** Some participants in past seminars have used the event set to set up a monitoring system, which they use to track the occurrence of real events against the assessments made during the exercises. This early warning system can show when the industry is taking a turn toward a specific end state or when events are happening that were not foreseen in the exercise. The latter may signal a need to re-evaluate strategies.

Examining one critical event in detail shows how team information can be used. Let's start with the event entitled "Multivendor Distributed Applications Platforms Realized." This event has made it to the critical list ever since it was first introduced. It states that distributed applications that cross multiple-vendor platforms become real by, say, 1991.

Every team saw this event as a requirement for its end state — with one exception. The team building a vision in which "Big Players Own the Future" decided this must not happen. Doing so would be a threat, even an admission of failure, to the single-vendor solution purchase. Given this knowledge, what actions can be taken? If you are not one of the few major vendors, quick and deep involvement in the multivendor distributed application movement is crucial. If you are one of the major vendors, your decision is more difficult.

> THERE SEEM to be four critical problems: network management, higher bandwidth on wide-area networks, network security and interoperable distributed applications.

Can you derail the development of multivendor standards for distributed applications? Can you accelerate the introduction of proprietary alternatives and gain market share before the industry standard is ready?

Having considered possible futures and alternative paths to achieving them, is there any consensus about key issues and actions or activities that can be done now? Our research shows that computing and communications technology is evolving — and key. As some problems get resolved temporarily, others become more prominent. The uniformity of answers suggests that having invested extensively in computers of all sizes and in local-area networks, the key issues in the market today concern enterprise networking.

Specifically, there seem to be four critical problems: network management, higher bandwidth on wide-area networks, network security and interoperable distributed applications.

This evolutionary nature of technology change — investment in computers and the lower layers of the International Standards Organization stack, then resolving problems and investing in higher layers — is not apparent from the end states, event set or scenarios. Instead, research suggests that it is only one outcome of two days of intense effort by leading experts using these techniques.

Studying research in different environments shows an evolution in thinking in the computer industry. Not long ago, for example, people gave little consideration to networks. "Networks" is no longer a gratuitous buzzword. Now, participants spend significant time on the issues raised by networks.

What will networks be used for? How should distributed applications and databases work? What standards are absolutely required for functional systems? How will these networks be managed — technically, legally, financially? These are key issues that need to be explored further by the industry. •

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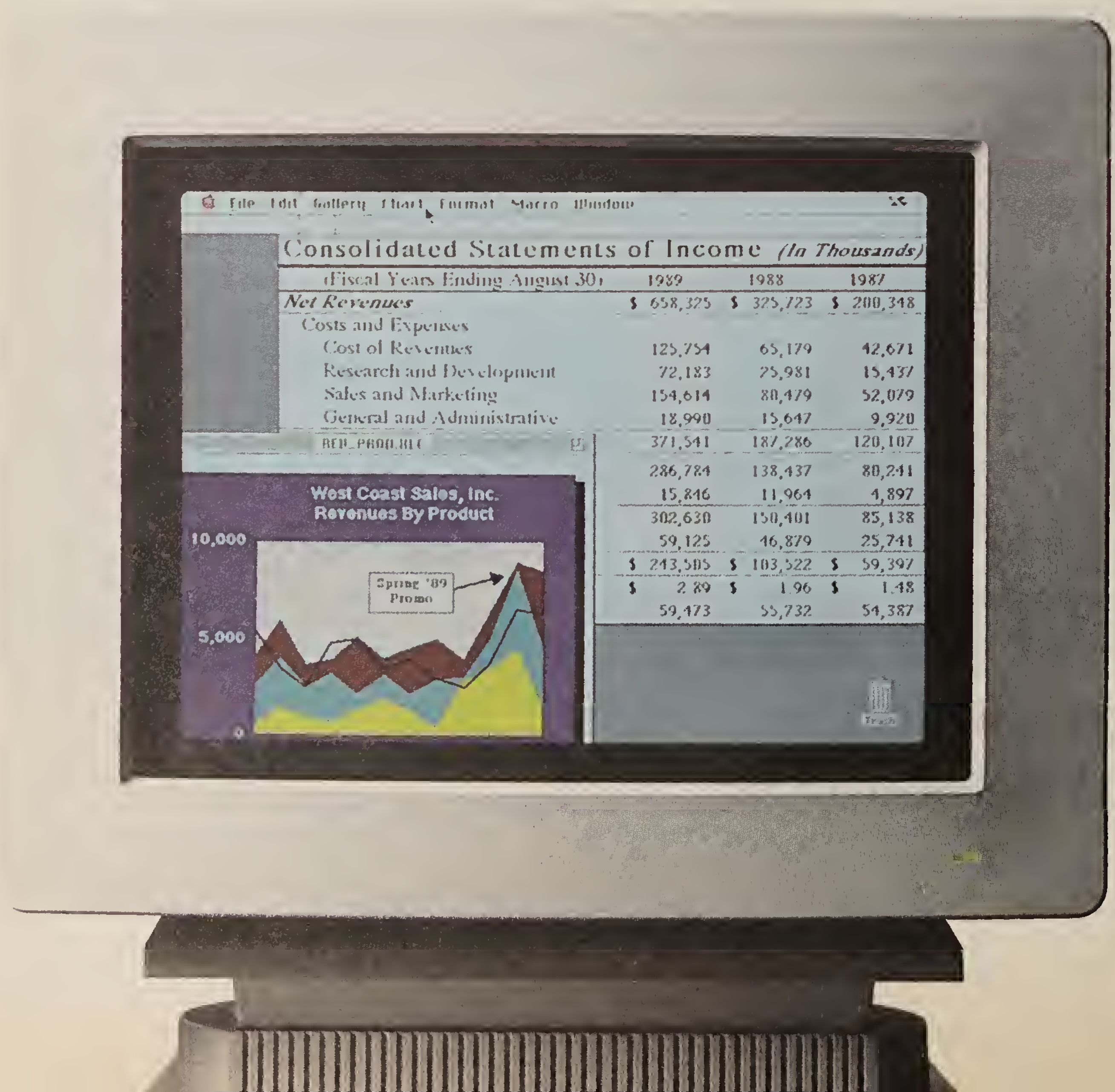
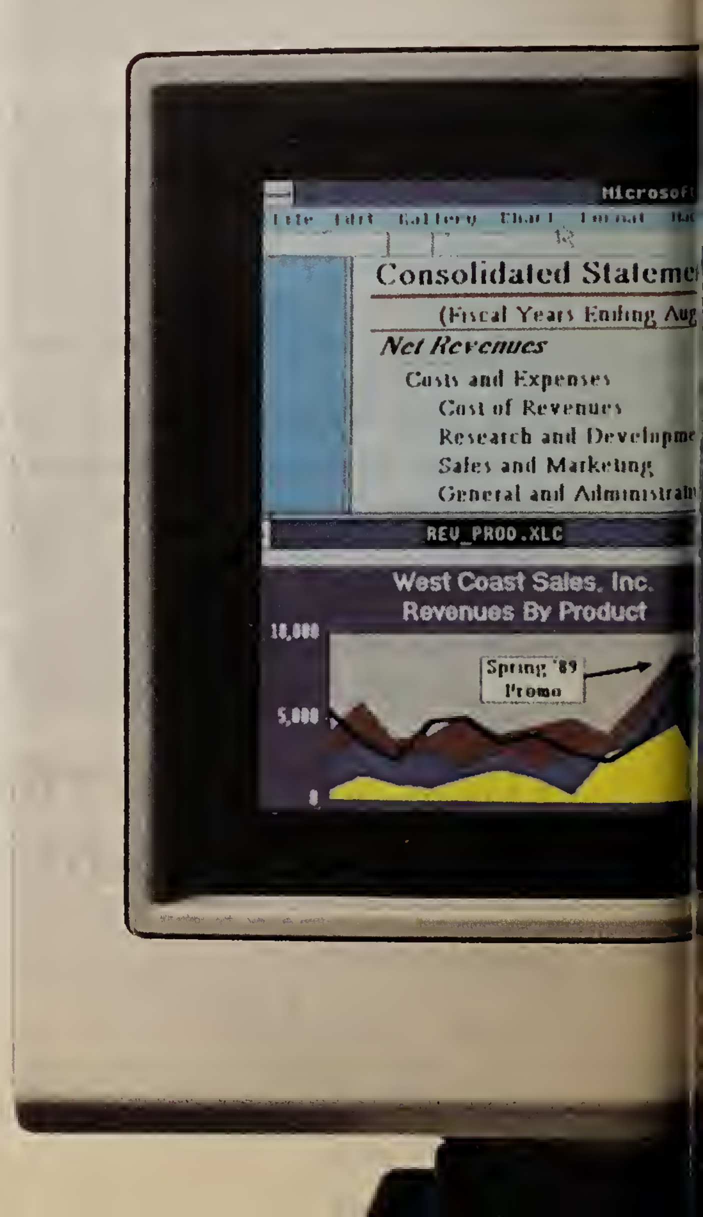


Consolidated Statements of Income *(In Thousands)*			
(Fiscal Years Ending August 30)	1989	1988	1987
Net Revenues	$ 658,325	$ 325,723	$ 200,348
Costs and Expenses			
Cost of Revenues	125,754	65,179	42,671
Research and Development	72,183	25,981	15,437
Sales and Marketing	154,614	80,479	52,079
General and Administrative	18,990	15,647	9,920
	371,541	187,286	120,107
	286,784	138,437	80,241
	15,846	11,964	4,897
	302,630	150,401	85,138
	59,125	46,879	25,741
	$ 243,505	$ 103,522	$ 59,397
	$ 2.89	$ 1.96	$ 1.48
	59,473	55,732	54,387

DOS-Windows 286/386



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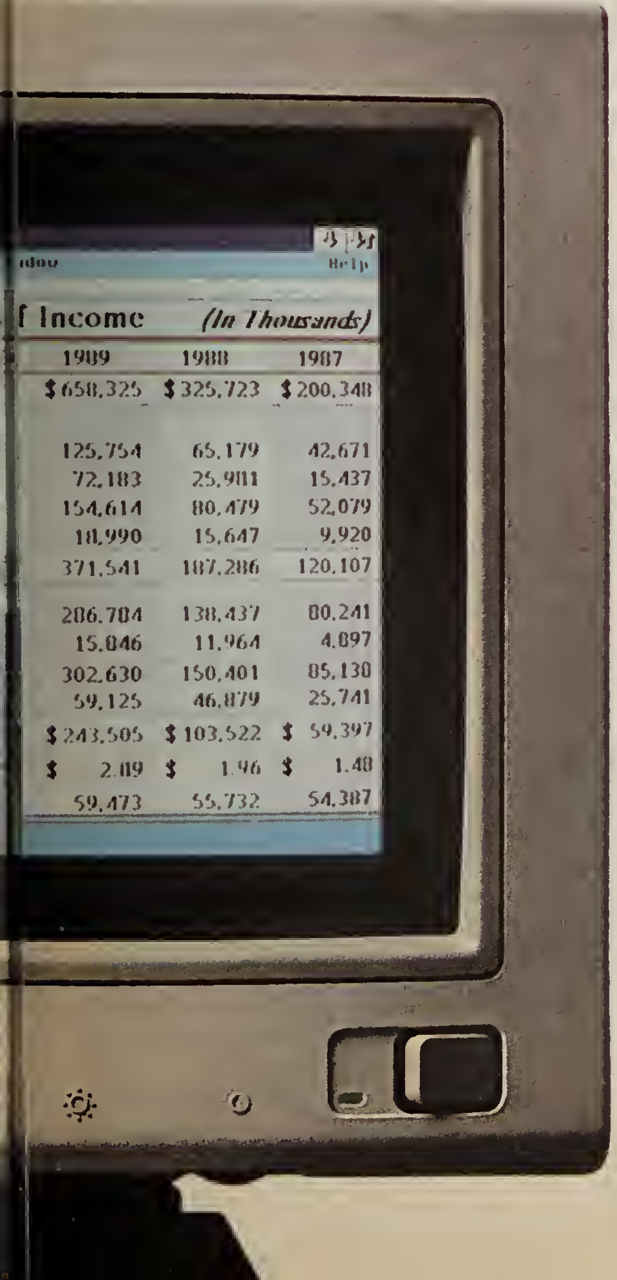

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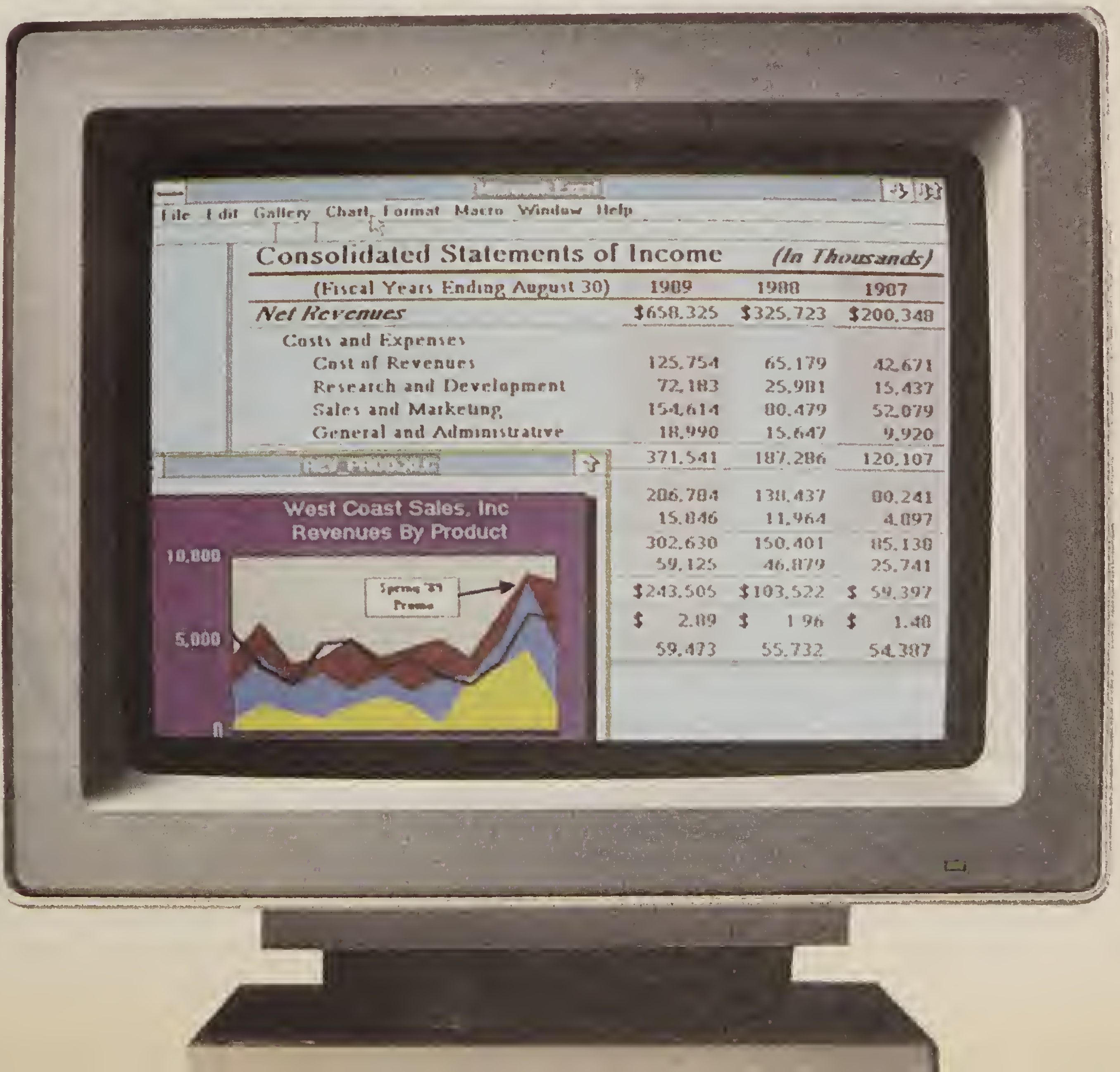

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	$243,505	$103,522	$ 59,397
	$ 2.89	$ 1.96	$ 1.40
	59,473	55,732	54,387

THEIR "RULES."

```
/ * MSG IKJ574I / * Reduce broadcast dataset full messages * /
                / * to 1 every 5 minutes * /
/ * INIT SECTION * /
prevtime = TIME(m) - 5
/ * PROC SECTION * /
IF (TIME(M) - prevtime > 5) | (TIME(M) - prevtime < 0) THEN DO
          prevtime = TIME(M)
          msg. user = 'DISPLAY'   / * Done for another Rule * /
          RETURN DISPLAY
END
/ * Here when an IKJ574I displayed in the last 5 minutes * /
msg. user = ''
RETURN SUPPRESS
```

OUR RULES.

```
R1: MSGID(IKJ574I), SUPPRESS
R2: MSGID(IKJ574I), EVERY (5 MINUTES), DISPLAY
```

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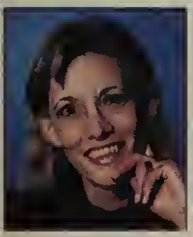
COMPUTER INDUSTRY

INDUSTRY INSIGHT

Nell Margolis

If he can't do it . . .



Long ago, in what definitely feels like a galaxy far away, I spent a summer as a law clerk on a case that my local attorney general's office was mounting against Glenn Turner, then notorious as the alleged king of cosmetics pyramid sales schemes.

The newly minted attorney chosen to try the case was fired as much by zeal as by ambition; he saw Turner as a slime-bucket scam master, charming the life savings out of hapless, helpless Mas and Pas.

One night, the dictates of thorough case backgrounding drove the lawyer to a Turner sales rally. We interns waited up for him, eager for a roistering account of high-tack, tent-show salesmanship. We never got it. What we got was a shaken, less fearless leader. "I believed him," he told us, his voice barely above a whisper.

He recounted how he had stood in the back of the room, feeling his professional skepticism and personal scorn draining away in the face of the magnetism of the man he pursued during his work time and mocked

Continued on page 93

Price extends branch into blooming market

BY RICHARD PASTORE
CW STAFF

SANTA MONICA, Calif. — Anticipating a swelling market for application conversion to new database platforms and repositories, Big Six accounting firm Price Waterhouse recently created a unit to provide data centers with software re-engineering tools and services.

Beginning in January, Price Waterhouse Technologies will provide consulting services and tools to Fortune 500 firms looking to migrate their existing applications from old database platforms to IBM's DB2 as quickly and painlessly as possible.

Because of the high cost of maintaining and enhancing applications based on older platforms, "we have seen a rising demand to do platform conversions," said F. William Hoffman, chief executive officer of Price Waterhouse Technologies. "The world appears ready to move to DB2."

Analysts said there is a market for tools that facilitate DB2 conversions. "In the last six months, we've seen a lot of people indicating that they are ready to switch," said Ed Acly, an analyst at Framingham, Mass.-based market research firm International Data Corp. He added that customer uneasiness over the fate of the former Cullinet Software, Inc. and its IDMS database platform was the biggest single factor in the mounting urge to migrate.

The company is also counting on clients converting to IBM's AD/Cycle repository and Systems Application Architecture platforms. However, that market is still two to three years from fruition, Hoffman said.

The key selling points of the Price Waterhouse service, according to Hoffman, will be price and speed. "The cost of doing a conversion by hand is enormous," he said. "We're working to bring that down." Time is another key consideration: "Companies want to get the job done quickly."

Price's *Hoffman sees demand for conversions*

Even with Price Waterhouse Technologies' products and services, a large system software conversion will typically take six months to a year, Hoffman said.

A Fortune 500 firm wanting to convert 15 to 20 years of applications developed for an old database platform "has an extremely large job to do," Acly emphasized. "If you can get a tool that will cut out a quarter or half of that, the price of that tool will be no object."

Price Waterhouse thinks it has found such a tool in Arrae, a computer-aided software engineering (CASE) product it acquired with the tool's developer, Errico Technologies, Inc.

"They had what our research

Continued on page 92

Government probes IBM contract

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A congressional inquiry into federal computer contracts has taken an unexpected turn with the disclosure that IBM delivered used computers rather than the new equipment required by three federal contracts awarded in the mid-1980s.

Edward F. Hefferon, assistant inspector general at the U.S. General Services Administration (GSA), testified Nov. 16 that the actions violated the terms of the GSA contracts and may have violated federal law.

In February 1987, IBM informed the GSA that it had miscertified its equipment as new when it was actually remanufactured, the auditor explained to the U.S. House Committee on Government Operations. The panel is conducting a series of oversight hearings that have otherwise focused on U.S. Navy contracts [CW, Nov. 13].

In addition, Hefferon testified that IBM miscertified its equipment as complying with the Buy American Act, which requires the government to buy systems that have a majority of their content produced domestically.

As Rep. John Conyers Jr. (D-Mich.), chairman of the committee, put it: "This great success symbol of the American economic system has misled its own government into believing that equipment delivered under contract contained a majority of domestically manufactured content when, in fact, it did not."

Hefferon said that both violations are serious matters that could lead to a fraud prosecution, but "the situation is somewhat mitigated by the fact that IBM came forward and advised us of these violations" prior to any government investigation. IBM has referred to the violations as minor administrative errors.

IBM offered to compensate the government by paying a settlement of $1.5 million, Hefferon testified, but the government will not consider a settlement until the full investigation is completed. He said IBM is cooperating with the investigation, although it has been slow to come up with documentation.

Resuming its focus on the U.S. Navy last week, the committee praised the department's

Continued on page 94

Sunburst strikes home automation horizon

BY JAMES DALY
CW STAFF

FREMONT, Calif. — Even with the most vivid imagination, it might be difficult to believe that Chinese Communist leader Mao Tse-tung could one day be credited with indirectly — but dramatically — helping to upgrade the creature comforts of the average American capitalist's home. Well, guess again.

Among the waves of refugees who fled one of Mao's brutal crackdowns on presupposed subversives more than 30 years ago was a slender and alert teenager with a keen interest in design. His name was Huey Lee.

"I had no background, no history and no wealthy family, but I did have confidence," Lee said. Four decades after those terrible years, the seeds that Mao cast adrift somewhere in the choppy South China Sea have germinated in Silicon Valley.

Last May, Lee formed Sunburst Systems, Inc., an energetic start-up that revolves around one simple tenet: For computers to become a useful tool for everyday life, they need to achieve the practical invisibility of telephones and microwave ovens. "Computer users want to have at home the sophisticated capabilities that they are used to in the office," Lee said. "It seems logical to have a single system that will satisfy both uses."

Initially, Sunburst will offer two workstations for home automation. The Integra 1 will go for a ground-up approach and be marketed to developers who wish to build the machines into their own new structures. The slightly less sophisticated Integra 2 is geared to home or small-business owners who wish to retrofit the workstation into existing structures.

The machines come preloaded with Burstnet, a software program that offers home automation functions as well as common business applications. Burstnet, according to Lee, leads the user through a hierarchical question set that allows housekeeping to be fine-tuned: How long should the lights be on? Which rooms should be lit? When should they be shut off?

Continued on page 94

Home, smart home

Anyone who has ever watched *The Jetsons* is familiar with the concept of the smart home — sophisticated electronics taking over the mundane chores of running the household.

Hate waking up on a bone-chilling morning? Tap into the Sunburst system for a few minutes before you hit the hay and the heat starts 20 minutes before you awake. Heard a noise in the backyard? With a few keystrokes, you can doublecheck to make sure your security system is on.

Huey Lee's dream machine is showing signs of solidifying into reality at a time when the industry is technologically ready to support it. Although the quest to provide a smart home has existed for years, what has been missing is a LAN — or "home bus" — that would make use of the electrical, telephone and wiring systems already in homes and allow a myriad of products to interact. Such a system now exists.

"It's an embryonic and very exciting time," said Tricia Parks, a principal at the Parks Associates consumer research firm in Dallas. With technology quickly catching up to the potential of the smart home, she said, "we're looking at a market that can grow up to 200% per year."

JAMES DALY

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Price

CONTINUED FROM PAGE 89

people said wasn't available" — a product that could re-engineer Cobol process code, Hoffman said. "And they had a technical lead on the market." Errico Technologies, spearheaded by software developer Steve Errico, who spent a decade refining his CASE entry, debuted last year. Informal beta users waxed enthusiastic over Errico's tool kit but questioned whether the start-up firm, a new kid on what was already a hotly contested block, could market its way to solo survival. The question became moot with the September 1989 Price Waterhouse purchase.

Arrae takes existing programs, converts them to data objects stored in a data dictionary and then allows new programs to be generated from the data objects.

The firm will make Arrae available to Price Waterhouse systems integrators, but it also intends to market the tool directly to customers for their own use.

Hoffman pointed out that there is very little competition in this conversion niche. "IBM has several national business units that do conversions to DB2, but they are not competing with us in the tools business," he said.

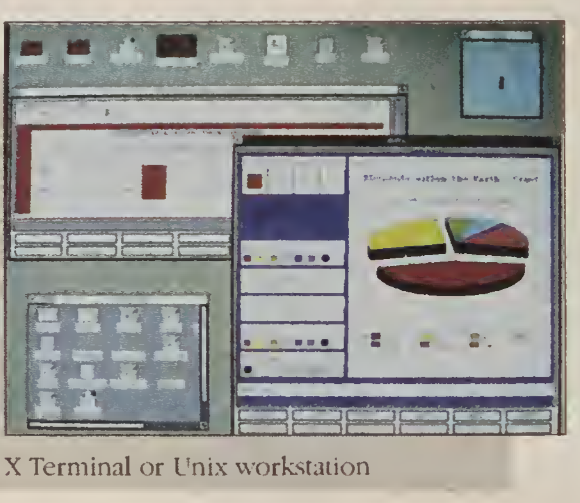
Hoffman added that IBM's AD/Cycle announcement did not include a re-engineering tool, "leaving that role open for us to fill." In fact, Hoffman hopes for an agreement with IBM in which the firm recommends Price's services to its AD/Cycle conversion customers. Currently, "We are making IBM aware that we can do this for their customers," he said.

Acly is doubtful that Price will get any help from IBM. "IBM is developing repository migration tools" and forging its own vendor relationships, he said.

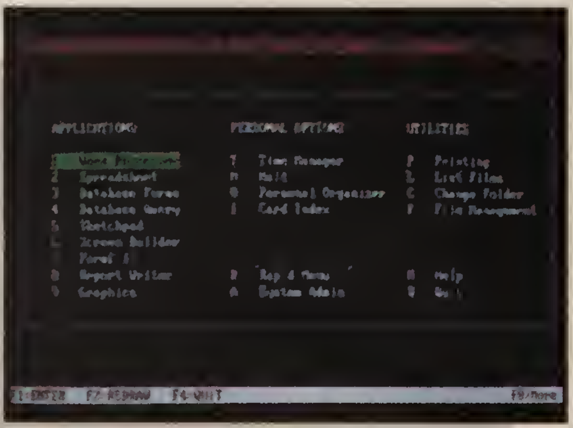
Hoffman said Price Waterhouse's failed merger attempt with fellow Big Sixer Arthur Andersen & Co. earlier this year had no bearing on the formation of Price Waterhouse Technologies.

If the merger had come off, the firms' CASE tools would have been complementary because Andersen lacks a software reengineering product. "There would have been no conflict between our re-engineering unit and Andersen's offerings," Hoffman said.

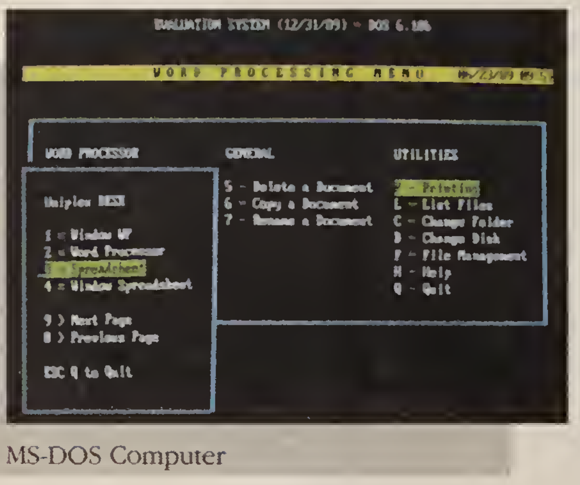
INTEGRATED OFFICE SOFTWARE



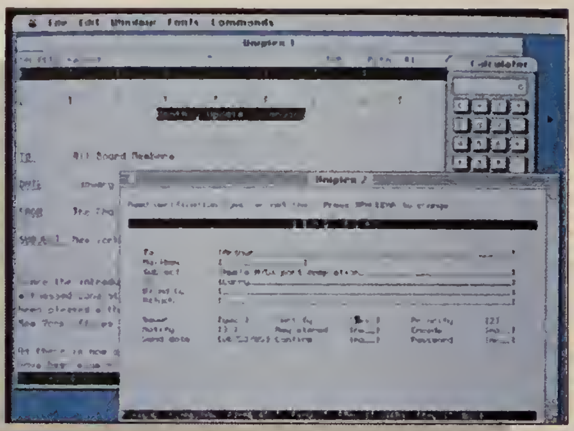
X Terminal or Unix workstation



UNIX ASCII terminal



MS-DOS Computer



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IN BRIEF

Another epoch

Computer entrepreneur **Chris Robert** is leaving **Computer Software, Inc.,** the company he co-founded, presided over and helped take beyond the $100 million mark in six years. Computer Software Chairman and Chief Executive Officer **Morton Rosenthal** will add president to his titles.

Robert, meanwhile, is not putting his career in cold storage — hot storage is more like it as he takes the reins as president and CEO of optical-disc file server start-up **Epoch Systems,** which he hopes to turn into another $100 million firm.

……

Tymnet born again

British Telecom signed and sealed its **Tymnet** acquisition from **McDonnell Douglas Corp.** last week. The San Jose, Calif., incarnation will be called **BT Tymnet, Inc.** and will be headed by former BT International marketing director Mark Baker. The new company will support all the Tymnet network products and services, including Ontyme and Dialcom electronic mail services and EDI*Net electronic data interchange systems.

……

Ripe for picking

Northern California-based computer dealer **ERA Computers** earlier this month snatched retailer **Computer Plus,** one of Silicon Valley's oldest independent **Apple Computer, Inc.** dealers. The retailers' combined 1989 sales are projected to be $17 million.

……

Good influences

IBM Chairman John Akers and **Compaq Computer Corp.** Chairman Rod Canion were chosen the No. 1 and No. 2 most influential industry executives, respectively, by *Computer Reseller News.* Akers was lauded for his participation in reviving reseller awareness and customer responsiveness at IBM. Canion was cited for his success in competing with IBM. Rounding out the top five were John Sculley, chairman of **Apple;** Bill Gates, chairman of **Microsoft Corp.;** and Scott McNealy, chairman of **Sun Microsystems, Inc.**

……

Consulting interest

Howard Charney, vice-president and general manager of **3Com Corp.'s** Central Manufacturing Division will leave that post to act as a consultant for the firm. Charney's desire to pursue outside interests precipitated the role change, the company said. "I look forward to continuing to work with the company on strategic projects in a consulting role," Charney said.

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   - **32.** Programmers, Software Developers

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   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr.
   - **12.** Vice President, Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt.
   - **51.** Sales & Mktg. Mgt.

   OTHER PROFESSIONALS
   - **60.** Sys. Integrators/VARs/Consulting Mgt.
   - **70.** Medical, Legal, Accounting Mgt.
   - **80.** Educator, Journalists, Librarians, Students
   - **90.** Others ____________ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - **A.** Mainframes/Superminis
   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Office Automation Systems
   - **F.** No Computer Involvement

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Hong Kong strong-arms alleged software gang

BY RICHARD PASTORE
CW STAFF

HONG KONG — In what may have been the largest successful raid ever launched against software pirates, Hong Kong authorities this month seized 109,437 suspected pirated software manuals worth a street value of $3 million.

The manuals were taken from members of a syndicate believed to account for two-thirds of the supply of pirated software and manuals in Hong Kong, according to the Customs Investigation Branch of the Hong Kong Customs and Excise Department.

Hong Kong authorities also found computers and pirated diskettes among the booty stashed in an unlicensed printing facility on the roof of a building here. So far, there have been 15 arrests.

The pirated materials in this seizure represent the equivalent of $30 million to $50 million in legitimate sales, according to customs authorities. The material was earmarked for delivery to customers via mail-order channels and four retail outlets.

Douglas Phillips, president of the Business Software Association, a Washington, D.C.-based trade group advocating software copyrights, lauded the Hong Kong authorities' efforts, and said BSA will take legal action.

"Hong Kong, once a center for copyright infringement, has become a leader in copyright enforcement," Phillips said. He added that the actions "demonstrate that governments can and should take the initiative to act against piracy" and called on European and other Asian governments to follow the lead.

Margolis

FROM PAGE 89

in his spare time. Finally, he told us, he fled in fear of forgetting who and what he was and signing on as a Turner salesman.

The echo of his amazed refrain, "I believed him," came zooming back to me across the decades early this month as I watched the skeptics react to Rick Miller, the new president of Wang Laboratories. From most vantage points, Miller — a veteran executive and vaunted turnaround wizard whose skills were honed in the virtually legendary cauldron of General Electric — would be hard to confuse with the reprobate Turner. When it comes to making believers, however, these respective exemplars of the very different meanings of the phrase "confidence man" are brothers under the skin.

Miller faces an audience packed with cynics. Investors and market observers who have been burned by once-glorious Wang's decline are waiting to see if he can make good on his goal of restoring black ink to the balance sheet by June 1990. Then there are users who are pleased with Wang technology and would like to be loyal to the company, but, given recent events, wonder how long there will be a company to be loyal to.

Three months ago, when the new president was appointed, members of all of these constituencies were at least willing to strike a "wait and see" pose — after all, they said, things could hardly get worse — but "encouraged" would have been too strong a word to describe most of the reaction, and "optimistic" would have been an outright lie. I shudder to think what any of these justifiably skittish folk would have said if, asking them what they thought of Miller's chances to turn Wang around, I had added, "And, oh, hey, listen to this, guys: He's going to center his strategy on *pleasing the customer.*"

However, early this month, when Miller announced just that, the dirge-like tempo that has surrounded Wang for months turned noticeably upbeat.

"Isn't it a pleasure to listen to a pro for a change?" sighed a local reporter who is hardly known for puff pieces and can sling the sarcasm with the best.

"If he can't do it, no one can," said a user. The last time I heard that line, it was in the mouths of college football cheerleaders . . .

"It won't be easy, but yes, I believe that he'll do it," an analyst said.

All of which might be dandy for the man but irrelevant to the company if Wang's troubles were rooted principally in its products. In the main, however, Wang's woes have been laid at the doors of marketing and management. "We *love* our Wang computers — we just hate having to deal with the company," a user said last spring.

Management, marketing and morale problems, even when grave, are ills that can be cured by corporate leadership wizardry — if, in Dorothy's words, "the wizard is a wizard who will serve." Will Miller? It's way too early to know — but, "I believe," coming from customers, is a bright start.

Margolis is *Computerworld's* senior editor, industry.

DOC mulls 'super' definition

ANALYSIS

BY ELLIS BOOKER
CW STAFF

Trying to balance legitimate security concerns with the desire to make the export process easier on U.S. vendors, the Department of Commerce is carefully drafting a new definition of a "supercomputer."

"It's very difficult to pick a number and say everything above this is subject to security [procedures]," said Willard Fisher, an export administration specialist with the DOC's bureau of export administration, office of technology and policy analysis. The efforts to draft new guidelines continue, as controversy builds over proposed supercomputer sales to Israel and other nations that some observers feel could use sophisticated systems to build nuclear weapons [CW, Nov. 20].

Last December, the DOC tried such a blanket definition, and in a draft proposal defined a supercomputer as any computer capable of 160 million floating-point operations per second (MFLOPS). However, the supercomputer industry and some government agencies objected — the first arguing that the level was too high, the second that it was too low.

In response, DOC is reconsidering its proposal. The new rule, Fisher said, will likely have a lower MFLOPS definition but add "at least two higher thresholds, based on the destination of the equipment" that would trigger security safeguards. The rule will not address the number of processors in the computer, he said.

Defining thresholds

The idea of a base definition with higher thresholds, Fisher said, will give the government the option to impose security procedures on a case-by-case basis while allowing a quicker processing of routine sales.

The final rule will be added to the Export Administration Act, which lacks a supercomputer definition.

Existing safeguards for high-technology commodities sold outside the U.S. include explicit statements regarding who the end users will be and what the machine will be used for. In addition, the re-export or resale of these systems requires U.S. government approval.

For now, all supercomputer sales outside the U.S. are subject to a case-by-case review, coordinated by the DOC. License approvals for sales to Western allies and Japan are relatively speedy, according to those familiar with the process, and take an average of about two months.

Meanwhile, vendors such as Cray Research, Inc., must appease those concerned about the potential military use of their equipment while attempting to press for the flexibility to compete in a global market that is being explored by powerful Japanese supercomputer companies.

"The two things we have expressed to [the] U.S. government are first, they are valued customers and we appreciate and respect their concerns," said Cray spokesman John Swenson. "Number two, we badly need to maintain competitiveness in foreign markets, and part of that is swift approval of export licenses."

Leasing market turning Blue hue

ANALYSIS

BY AMY CORTESE
CW STAFF

The leasing subsidiary of IBM is poised to dominate the computer leasing market, according to industry observers.

Overall, IBM Credit Corp.'s (ICC) net earnings rose 34% to $94 million for the nine months ended Sept. 30, 1989, before a onetime $52 million downward tax adjustment. And third-quarter earnings were up 37% from a year ago. Fueling the growth is a surge in ICC's customer financing business, which accounts for 85% of its business. ICC President Harry Kavetas said that end-user financing for the first nine months of 1989 was up 83% from last year's comparable period.

Ironically, the glowing results cast a short-term shadow on the financial profile of ICC's parent company. Earlier this year, IBM cited its leasing division's increase in operating leases as a factor contributing to its own lower third-quarter earnings expectations. Its subsidiary's operating leases, in which the customer's payment is broken up into an annuity-like stream, provide a steady flow of payments to the parent company; however, under current accounting rules, the parent is not allowed to record the full purchase price of equipment as a sale up front.

Typically, short-term operating leases are on the rise, analysts said. One reason, they explained, is that many of IBM's major products — the 3090 mainframe and 3380 disk drive, for instance — are near the end of their life cycles. In particular, the so-called Technology Exchange Option, an operating lease allowing a trade-in after a short period of time, proved to be very popular with customers who need to make do with a 3380 while waiting for the delayed 3390 disk drive announced earlier this month [CW, Nov. 2].

Cliff Friedman, an analyst at CJ Lawrence, Morgan Grenfell, Inc., estimated that between $200 million and $300 million of ICC's overall $870 million in operating leases can be attributed to the 3380.

Long-term profits

The operating lease phenomenom may hurt IBM in the short term, analysts said, and at the very least make it more difficult for them to analyze the company's performance. But most agreed that in the long run IBM will realize greater profits as well as a steady income stream from leasing. Analysts noted ICC's 17% return on equity (ROE) compared with an average of 14% ROE for IBM as a whole. And ICC was able to distribute a $72 million dividend to IBM's bottom line in the first nine months of this year.

Meanwhile, ICC's growth is far outpacing that of the overall leasing market, and it is growing largely at the expense of its independent leasing competitors, according to industry observers.

Bill Day, vice-president at Technology Investment Corp. in Greenwich, Conn., said that ICC has taken $1 billion worth of business away from the rest of the leasing industry so far this year. "IBM Credit Corp. is starting to take so much market share that it might be considered a monopoly now in the computer-leasing market," he maintained. Day said that IBM has made a major effort to expand its leasing business and is using its other two lines of business — reseller financing and financing of IBM employee mortgages — essentially to subsidize the low rates it is able to provide to end users.

Friedman agreed that IBM has a lower cost of capital than any independent leasing company and is therefore able to undercut its competitors. "Leasing is just another form of discount," he said. "IBM is using its balance sheet as a marketing tool."

However, Kavetas attributed the increased business to a more flexible and responsive — and therefore more competitive — ICC. Additionally, he said, greater certainty in the leasing business has allowed IBM to use the cheapest equity — namely, borrowed money — to keep financing rates down.

Sunburst

CONTINUED FROM PAGE 89

Basic systems will cost around $20,000, according to Lee.

Additionally, Sunburst is selling a series of high-performance workstations specifically targeted at business use, so the company can cover the office as well as the home market. The Sunburst 386 systems run on Intel Corp.'s 80386 or 80486 microprocessors.

Providing a machine that is convenient for both home and office use puts Sunburst at the crest of a rapidly forming wave. More than 14 million people now derive at least part of their income from working at home, according to CAP International, a market research firm in Norwell, Mass.

Another 14 million, CAP said, routinely shuttle work between their homes and offices.

If Lee's far-reaching plans sound like he's shooting at the moon, that's understandable. At 54, Lee has a history of keeping his feet on the ground and the cosmos in his cross hairs. Twenty years ago, he worked as an engineer for Palo Alto, Calif.-based General Precision, Inc., helping to create a radar simulator for moon-bound astronauts. Before that, he worked for Lockheed Corp. in Sunnyvale, Calif., on the Poseidon project, which designed the prototype for the current generation of nuclear-powered U.S. Navy submarines.

In 1977, he formed Advanced Technical Services, Inc. (ATS), an electronic assembly house. ATS began at a time when many Silicon Valley firms were cutting back on staff by farming out assembly work to such firms. By its fourth year, the company had 300 workers and was doing assembly work for such industry heavyweights as IBM, Apple Computer, Inc. and Atari Corp.

However, when the dramatic growth curve of the computer industry suddenly flattened a few years back, so did ATS. A series of setbacks — including customers who defaulted on $2 million in receivables — clipped ATS at a time when the company was trying aggressively to expand. The money dried up, and in 1987 Lee was forced to close the doors on ATS.

Earlier this year, he bounced back with Sunburst. Financing has been kept close to the vest; Lee claims that the company, less than six months from inception, is already nearing a break-even point.

For now, all the machines are being hand-assembled at headquarters. Lee said he will soon begin investigating manufacturing resources in both Taiwan and Hong Kong.

Meanwhile, he hopes to entice customers with free local installation and training classes and a two-year parts-and-labor guarantee — extravagant by industry standards.

"We've now got all our pieces in place," Lee said. "Now it's up to us to keep our eyes on the road and step on the gas."

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IBM

CONTINUED FROM PAGE 89

recent efforts to fix problems highlighted in previous hearings, especially the apparent bias toward IBM-brand hardware in several procurements.

The Navy's internal investigation report acknowledged that a few Navy procurements were steered toward IBM. In cases in which the contracts had not been awarded, changes were made to foster full and open competition, it said.

In addition, Navy Secretary Lawrence Garrett announced the following steps to prevent future abuses in the writing of computer specifications:

- A reorganization plan will move the Office of Information Resources Management under an acquisition-management office, and the function of writing specifications will be separated from the rest of the acquisition process.
- GSA's Federal Systems Integration and Management Center will provide an independent technical review of Navy computer specifications.
- Navy officials will re-emphasize that specifications should be written by government employees rather than contractors and that employee attendance at vendor-supplied training courses must be approved by ethics officers.

The congressional inquiry was triggered by a group of six IBM plug-compatible vendors, which charged that the Navy rigs its IBM-compatible procurements to favor IBM-brand equipment.

NICKELS & DIMES

Local-area network manufacturer **Corvus Systems, Inc.** reported net sales of $15.1 million for its 1989 fiscal year ended May 31, 41% below fiscal 1988's sales of $25.4 million. A net loss of $2.8 million was reported for the year, compared with fiscal 1988's net profit of $2.3 million.

Wordstar International, Inc. announced fourth-quarter revenue of $11.3 million, with net earnings of $267,000 before considering a write-off of $1.1 million for its investment in an Apple Computer, Inc. Macintosh product acquired from **Challenger Software** in Homewood, Ill. Including the write-off, the company reported a $793,000 loss for its fourth quarter ended Aug. 31. In the like quarter of the preceding year, the company reported a net loss of $1.1 million on revenue of $12.1 million.

Arms and the IS manager

Weapons makers learn to wield systems to counter slackening demand

BY DAVID A. LUDLUM
CW STAFF

The peace offensive of Soviet President Mikhail Gorbachev and Uncle Sam's efforts to rein in spending don't bode well for U.S. manufacturers of big-ticket military hardware and the thousands of information systems managers they employ.

Furthermore, recent years have seen a narrowing of the technological gap between U.S. defense contractors and their counterparts in other countries, particularly Japan. That development means U.S. companies likely will see slower sales to foreign governments and to the Pentagon, which is increasingly concerned with getting the best deal available and encouraging teamwork among suppliers.

However, aerospace companies and other weapons makers have already moved to address slackening demand for their wares, and many executives say they do not expect a dramatic industry contraction. Also, as with restructuring in other fields, belt-tightening can spell opportunity for IS managers, and companies are forging some additional opportunities by adopting a more global orientation.

Earlier this year, the Aerospace Industry Association reported that employment among American makers of military aircraft peaked in 1987; the association said the number of workers fell by about 28,000 last year to 432,000, and it projected a further decline of 15,000 this year. Employment among manufacturers of missiles and space systems peaked in 1986 at 287,000; the association projected a slight upturn to 277,000 this year.

IS organizations won't escape the squeeze, according to executives at several major defense contractors. "In our firm as well as the other big aerospace companies, the number of managers is not going to grow," says James Sutter, vice-president and general manager of information systems at Rockwell International Corp. in Seal Beach, Calif.

At Lockheed Corp. in Calabasas, Calif., the number of IS management positions should either stay the same or decline in coming years, says Dean Allen, vice-president of information and administrative services. Lockheed recently merged aircraft facilities in California and Georgia, consolidating their IS groups.

At Grumman Corp. in Bethpage, N.Y., whose F-14 Navy fighter may fall victim to congressional budget-cutting, Director of Information Resources Management J. Thomas Kelly does not foresee business expansion or opportunities for outsiders to join the IS area. But he does expect opportunities for IS managers who are already there. "I think the people already on board have a challenge to see that our information resource investments can aid the company in our tight budget days," Kelly says.

At Lockheed, Allen says, "technology will continue to be an offset to labor." General Dynamics Corp. in St. Louis will actually take on more IS managers, even though it no longer faces a growth market. "Because of the increasing use of computers to find more efficiencies and more effective ways of doing business, we're not experiencing a decline and in fact will be having a slight increase in [IS] personnel in 1990," says Asaph Hall, vice-president and general manager of General Dynamics' Data Systems Division.

The executives echo each other in describing the type of IS manager they value: one who understands the breadth of the company's business, including its strategic goals, such as cutting costs, boosting revenue or gaining market share.

Allen says IS managers must be effective leaders capable of "forward thinking" — people who can anticipate events and technologies and develop strategies and plans to prepare a company for the future.

Those qualities, along with understanding the business, do not necessarily require an MBA; any manager should have them, Allen says. "There's been a sense that because someone has a technological bent, somehow he doesn't know what's going on in the world and the business. I don't accept that," he says.

A growing globalization of the aerospace industry calls for managers comfortable with foreign people and governments. "Without question, our company will be supplying the European airframe makers," Sutter says. "It will be important not to be stymied by the added complexity of working out multinational agreements with vendors."

Systems integration tops the list of IS functions that the executives say they expect will take on particular importance. "It seems to be fundamental to all the things we're involved in," including computer-integrated manufacturing, Allen says.

Computer-aided design (CAD), a field in which aerospace companies have been leaders, will continue to be important. "It's still vital for each of us to maintain the leading edge in that area to remain competitive," Kelly says.

IS professionals generally work in partnership with engineering people to manage CAD systems. At Rockwell, IS professionals evaluate workstations, software and the networking of CAD equipment with other systems, including supercomputers.

Similarly, IS people team up with others at General Dynamics to develop computer-aided manufacturing and software that is embedded in products, both key areas. Another one is the evolution of electronic data interchange with the government, subcontractors and suppliers. Further down the road will come standardized digital transmission of engineering drawings. Both developments will be prompted in part by more frequent domestic and international teamwork among contractors.

Other key activities for the contractors in coming years include implementing computer-aided software engineering, running diverse and disparate networks for optimal performance and managing data, which Allen calls another form of integration. "I think people who understand the needs of the business and how to distribute data, as well as aggregate it and control it, are going to be increasingly important," he says. "It's a tremendous opportunity to make a contribution that would not go unrecognized."

Ludlum is a *Computerworld* senior writer.

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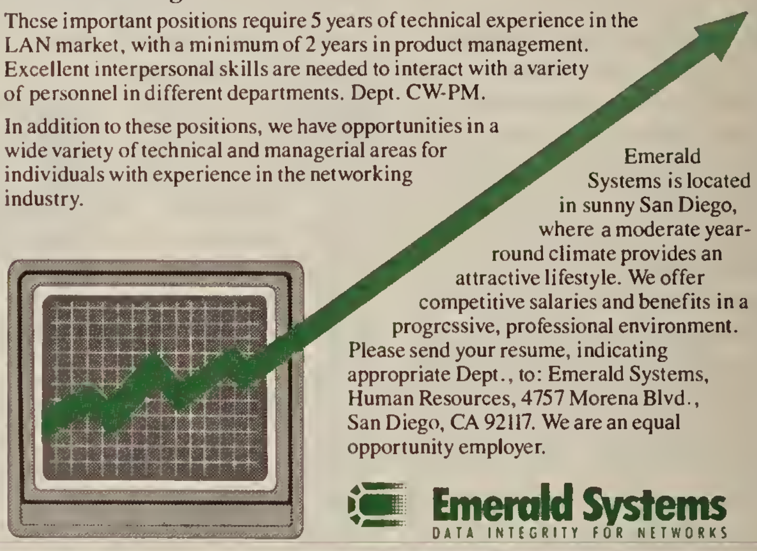

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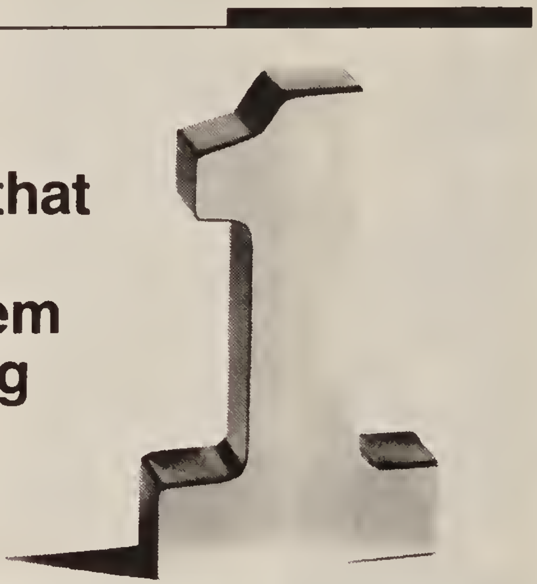

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IDMS ADS/O	**IBM MINIS**	WANG
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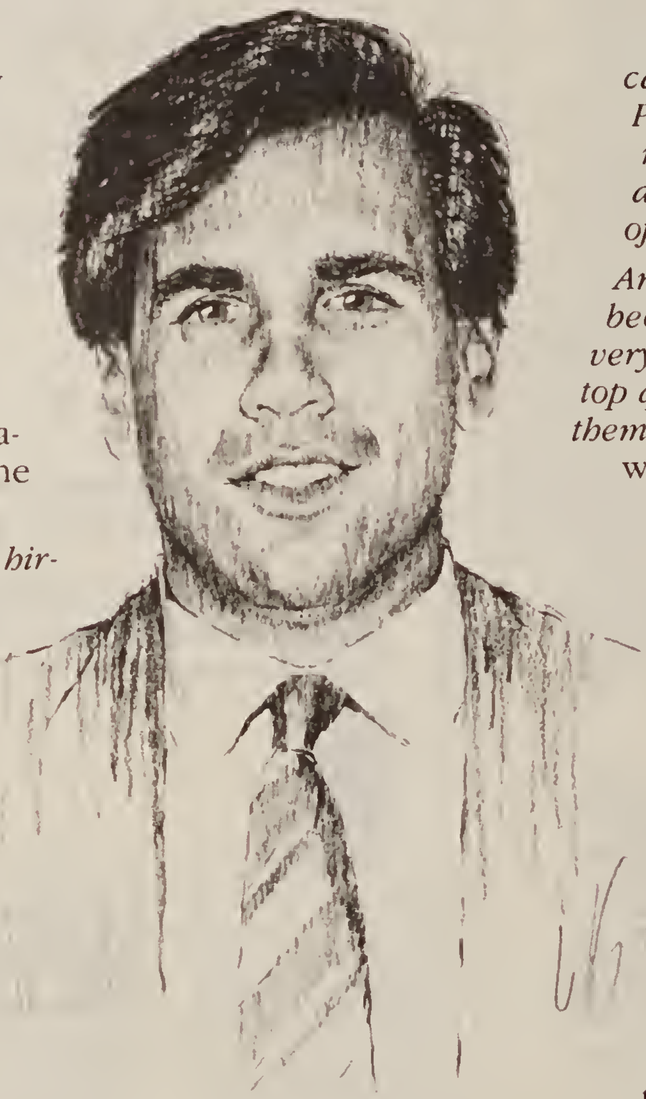

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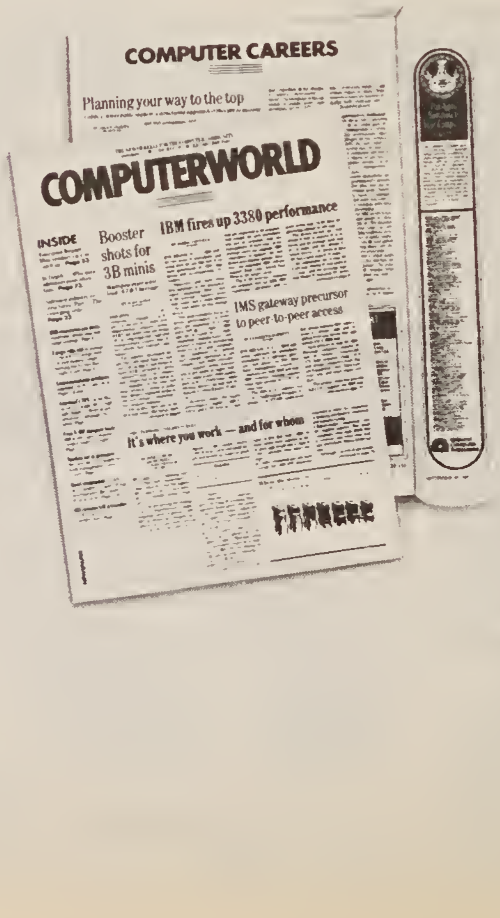
We're very happy with Computerworld. *For our needs, its the best publication we've used. That's why we're planning to continue to advertise in* Computerworld *in 1989."*

Computerworld. We're helping serious employers and top computer professionals get together. Every week. Just ask John McFarland of Executive Life. For all the facts on how *Computerworld* can put you in touch with qualified personnel, call your local *Computerworld* Recruitment Advertising Sales representative today.



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An IDG Communications Newspaper

Business Analyst for W. Central OH mftr. to provide support to the Customer Service Center in the interpretation, evaluation, analysis & implementation of various business policies & procedures & to promote improvements in operations & administration. Conduct surveys/research to determine potential sales of products. Examine & analyze statistical data to forecast future marketing/customer trends. Gather data on competitors & analyze prices, collect data on customers preferences, prepare reports & graphic illustrations of findings. Refine data (gathered through research) & convert to programmable form for electronic data processing. Evaluate daily business internal procedures & make functions (such as purchasing, customer orders, inventory control, etc.) compatible with the computer system (internal functions have to be compatible with the computer system for smooth operation of the business). Analyze forecasting & budget figures. Travel 10-15% of time. No axp. required. Must have B.S. in Data Processing Sci. or Comp. Sci. & graduate courses in Management (4), Marketing (3), Operations Management (2), Accounting (2) & Finance (1). 40 hrs/wk, 8-5 $35,000/yr. Qualified applicants send resume (NO CALLS) to R. Lechler, JO# 1185582, Ohio Bureau of Employment Services, PO Box 1618, Columbus, OH 43216.

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The Center for Computer Aided Design seeks an Associate Research Scientist to supervise and carry out research and object oriented software development. Applicants must have a Ph.D. degree in Mechanical or Civil Engineering. At least 2 years experience in large scale CAE software design and object oriented programming is required, either before or after receipt of the Ph.D. degree. Salary is $43,000 per year. Send resume and three letters of reference to **E.J. Haug, Director, Center for Computer Aided Design, College of Engineering, The University of Iowa, Iowa City, IA 52242.** An Equal Opportunity/Affirmativa Action Employer. Women and ethnic minorities are encouraged to apply.

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Computer systems consulting and software development company in Cincinnati, OH is seeking a systems engineer (systems analyst) to design, develop and integrate software systems for industrial environment. Responsibilities include development of Transaction Engine for Clipboard using the following languages: C, ADA, CP/M, D Base II, DOS, Fortran, MS/DOS, Pascal, CNC Part Programming, 8080 Assembler, SAS, UNIX and VAX VMS.

Candidate must have Bachelor of Science degree in either mechanical engineering or computer science and at least one yaar of experience in job described or as a systems analyst. 40 hours per week. 8:00 a.m. - 5:00 p.m. Salary $29,540. Send resume (NO CALLS) to R. Lechler, JO# 1099656, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, Ohio 43216.

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PROJECT LEADER for Southwest Ohio Financial Systems Automation Firm to plan, organiza, and control specific assigned projects for automating financial institutions. Responsible for all systems analysts and programming related to the project. In next 3-5 years will be expected to prepare written and oral management presentations and supervise systems analysts and other professionals. Analyze financial and banking procedures and problems to refine data and convert it to programmable form for electronic data processing. Design, code, and debug programs utilizing IBM host computers interfaced to NCR automatic teller machines. No axperience required in abova duties but applicants will qualify with a Bachelor of Science degree in Computer Science and as part of academic record, at least one course in each of IBM 370 Assembler Language, in CICS, and in Computer Communication. In addition nine months experience is required as a Systems Analyst in the design and implementation of NCR ATM connection to IBM Host mainframes using IBM 3090, IBM 43XX, Supported Paripherals, and NCR 508XATM's hardware, as well as IBM MVS, VTAM, NCP, and NCR PAS software. 40 hrs/wk., 8:30AM-5PM, $28,500/yr. Qualified applicants send resume (NO CALLS) to C. Bussard, JO#1211951, Ohio Bureau of Employment Services, P.O. Box 1618, Columbus, OH 43216.

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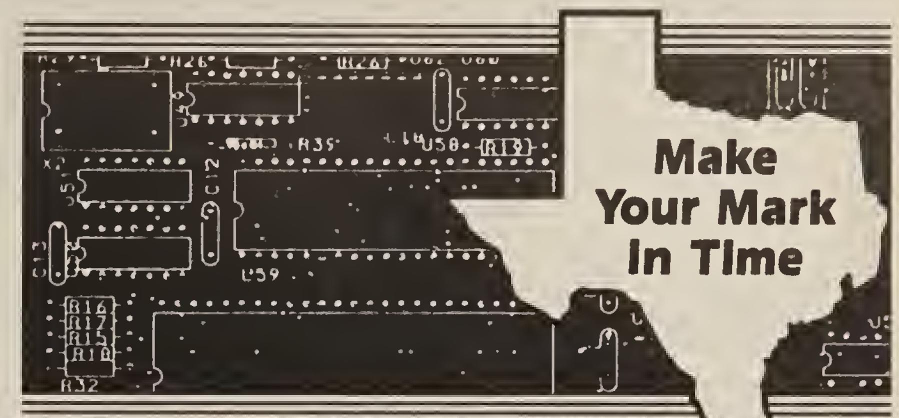
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In Dallas, Texas, we are renowned for lifestyle advantages which include a warm climate, abundant recreational facilities, affordable housing and a moderate cost of living. At AMRIS Travel Services Division, an affiliate of American Airlines, we're dedicated to the development of innovative computer information systems aimed at revolutionizing the non-airline reservation network for the hotel and car rental industry. For professionals with expertise in one or more of the following areas, we offer outstanding career opportunities for you to make your mark in time.

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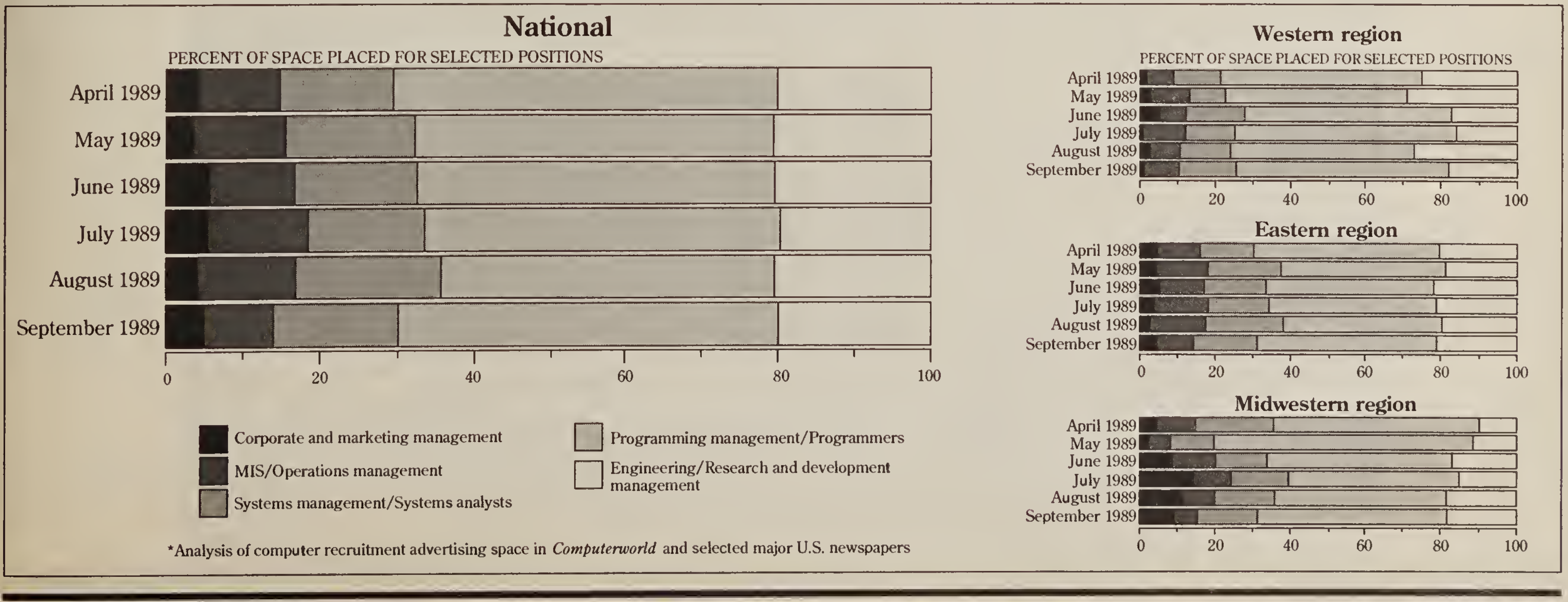
All qualified candidates are encouraged to reply, regardless of prior contact with our organization.

CAREER INDEX

Computer recruitment advertising activity*



*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATABASE

CW CHART: FRANK C. O'CONNELL

It's easy to place your recruitment ad in Computerworld!

All the information you need is right here. Just call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700). Or, if you want, you can send us the form below via mail or to our FAX machine. You can reach our FAX at ext. 739 or 740 at either of the above numbers.

The following information will help you determine the size ad you'd like to run and when you'd like to run it.

CLOSING DATES: To reserve space, you need to call us by 5PM (all continental U.S. time zones), 6 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 5 days prior to the weekly issue.

AD COPY: We'll typeset your ad at no extra charge. You can give us copy via phone, U.S. mail, or FAX. To typeset an ad for you, we need clean, typewritten copy. Figure about 30 words to the column inch, not including headlines. (There are seven columns on each page.)

LOGOS AND SPECIAL ARTWORK: Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4″	2″
2 columns	2-5/8″	2″
3 columns	4-1/16″	3″
4 columns	5-9/16″	4″
5 columns	6-15/16″	5″
6 columns	8-3/8″	6″
7 columns	9-3/4″	7″

RATES: Your rate will depend on the size of your ad and whether you choose to run regionally or nationally. The national rate is $13.50 per line or $189.00 per column inch. The regional rate (Eastern, Midwestern or Western editions) is $9.00 per line or $126.00 per column inch. You can run your ad in any two regions for $11.60 per line or $162.40 per column inch. In all cases, you can earn volume discounts.

The minimum ad size is two column inches (1-1/4″ wide by 2″ deep) and costs $378.00 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at $94.50 per half inch. Box numbers are available and cost $25 per insertion ($50 if foreign).

Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1-4/16 inches wide) by two inches deep (like this sample). This ad would cost $378.00 in our national edition, $252.00 in the Eastern, Midwestern, or Western edition, and $324.80 in two regions; volume discounts apply.

SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	*Two Regions (East/West East/Midwest, Midwest/West)*	*National Edition*
1 column x 2″	$ 252.00	$ 324.80	$ 378.00
2 columns x 2″	$ 504.00	$ 649.60	$ 756.00
3 columns x 3″	$1,134.00	$1,461.60	$1,701.00
4 columns x 5″	$2,520.00	$3,248.00	$3,780.00
5 columns x 7″	$4,410.00	$5,684.00	$6,615.00

PAYMENT: If you're a first-time advertiser or if you haven't established an account with us, we need your payment in advance (or with your ad) or a purchase order number. Once you have established an account with us, we'll bill you for any ads you run as long as your payment record is good.

COMPUTER CAREERS NETWORK BUYS: You can take advantage of special rates that let you run your ad in *Computerworld* and *Computerworld*'s sister newspapers at special rates. Choose from *Computerworld Focus on Integration, Network World, InfoWorld, Digital News and Federal Computer Week. Call for details.*

Computerworld Recruitment Advertising Order Form

Ad Size: ______ columns wide by ______ inches deep

Issue Date(s): ____________________

Name: ____________________

Company: ____________________

Address: ____________________

Telephone: ____________________

Region: ☐ East ☐ Midwest ☐ West **National:** ☐
☐ East/Midwest ☐ Midwest/West ☐ East/West

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375 Cochituate Road, Box 9171, Framingham, MA 01701-9171
800-343-6474 (In MA, 508-879-0700)
Telecopier Extensions: 739 or 740

MARKETPLACE

Countering connect charges

Training, software and bulk buying can cut the costs of on-line services

BY JANET RUHL
SPECIAL TO CW

For many smaller information systems organizations, the problem-solving advice that is available through the special interest groups of on-line information services can provide a cost-effective alternative to maintaining an in-house technical support staff.

Major on-line services, such as those offered by Compuserve, Genie, BIX and Delphi, provide a meeting place — available 24 hours a day — where IBM Personal Computer and Apple Computer, Inc. Macintosh specialists swap fixes, post patches and explore creative solutions to the most obscure computer problems.

However, many businessmen shy away from using these services as a problem-solving resource because they have had confusing and frustrating experiences with them, such as getting steep monthly bills for what they see as unsatisfactory explorations.

Businesses that want to make the most of this resource need to do three things:

- Invest in brief training programs for users before sending them on-line.
- Buy special-purpose software that automates and simplifies the use of a particular on-line service.
- Investigate special rates and other options available to corporate buyers who can purchase on-line services in bulk.

If you are serious about getting the most for your on-line dollar, you should invest in some training for your users before allowing them to log on. The cost of such classes should be more than made up for in the hours that users do not waste trying to orient themselves on-line at rates of 25 cents or more a minute.

A good on-line training class should give users an overview of the service they plan to use; the trainer should introduce them to specific services available, show how to use them, explain their costs and provide useful reference material that they can rely on later.

This kind training is available from a number of sources. One company that specializes in it is Mentor Technologies in Columbus, Ohio, which provides courses that are targeted at Compuserve users. The courses are available in a number of major cities and can be bought in a self-study form.

By far the best cost-cutting step a business can take is investing in one of the software packages for automating use of on-line services. Reading and writing messages on-line gets expensive very quickly at typical per-minute rates. All these software packages permit users to read and write bulletin-board messages off-line using copies downloaded to their disks. The software programs only use expensive on-line connect time to upload and download messages or message descriptors using preprogrammed scripts at the highest modem speed the hardware will support.

With such software and a 2,400 bit/sec. modem, it is possible to keep up with the message traffic for three or four special interest areas on a regular basis with an investment of only five minutes of connect time a day. It usually takes only 10 minutes of connect time to post a message describing a problem and, over a few days, retrieve a string of replies.

Compuserve users seeking such software for the PC can get the shareware product TAPCIS-from Omni Information Resources or the public domain program Autosig Macintosh users can try Compuserve's own Navigator product.

TAPCIS not only streamlines the use of Compuserve's special interest areas, called forums, but it also integrates Compuserve's Easyplex electronic mail service. Users who learn their way through the simple screen interface of TAPCIS need to know little else about how to navigate Compuserve's often complex menus and commands.

On-line ordering

All these products can be downloaded or, in the case of Navigator, ordered on-line through Compuserve. Similar products are available for other services. Aladdin is designed for use with Genie and distributed by the operators of the service's PC roundtable. BIX users can try Scanmaster from J and L Consulting in Bowling Green, Ky., which can be downloaded from BIX.

Finally, corporate users should investigate whether an on-line service offers special rates or corporate billing options. Compuserve and BIX allow corporate users to bill all of their accounts on one invoice, which makes tracking overall usage much easier. Genie plans to add this service in the future.

Special corporate rates may be available to companies that maintain a large number of accounts. BIX, which offers users a flat rate for its service, is willing to negotiate discounts with corporations that maintain a large number of accounts.

Corporate buyers who use a packet-switching network to access on-line information services may also be able to negotiate discounted rates with the network. And do not forget that local telephone companies are getting into the information network business, too. Some of them may be able to offer cheaper access to packet-switching networks, as does Southern New England Telephone's Connecticut-based Conn-Net. Others are introducing intelligent gateways of their own and may be willing to negotiate rates with large corporate customers.

Ruhl is a consultant programmer in Connecticut and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals.*

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The BoCoEx index on used computers

Closing prices report for the week ending November 17, 1989

	Closing price	Recent high	Recent low
IBM PC Model 176	$530	$750	$500
XT Model 086	$865	$1,150	$700
XT Model 089	$1,025	$1,400	$950
AT Model 099	$1,600	$1,775	$1,500
AT Model 239	$1,825	$2,100	$1,700
AT Model 339	$1,825	$2,000	$1,700
PS/2 Model 50	$1,525	$1,900	$1,500
PS/2 Model 60	$2,700	$3,100	$2,500
Compaq Portable I	$550	$750	$325
Portable II	$1,625	$1,725	$1,550
Portable III	$2,180	$2,875	$2,100
Portable 286	$1,900	$2,000	$1,600
Plus	$750	$950	$675
Deskpro 286	$1,625	$2,350	$1,700
Deskpro 386	$2,800	$2,900	$2,500
Apple Macintosh 512	$675	$900	$550
512E	$750	$925	$550
Plus	$925	$1,050	$900
II	$3,500	$4,000	$3,300
Toshiba T-1600	$3,125	$3,000	$2,500
Zenith 183	$1,000	$1,375	$1,175

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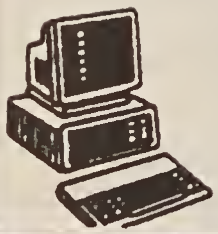

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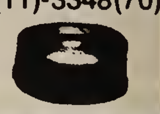

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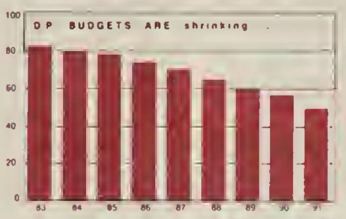

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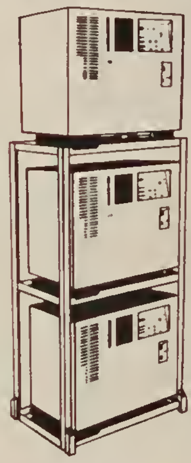

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CSFs for the training program

Some important factors must be considered when planning for training

BY MARK DUNCAN
SPECIAL TO CW

There is no complete list of critical success factors that will guarantee the viability of a training program. What works for one organization may well doom another. However, there are some fundamental factors that bear consideration for most training programs. As they identify needs and arrange training, managers may want to consider the issues that follow.

Realistic needs analysis. An authentic needs analysis is the logical starting point for any training program. That is not to say that it cannot be repeated at appropriate intervals. To be authentic, the needs analysis must combine a balanced mixture of needs and desires. The former ensure the knowledge and skills for planned projects; the latter provide the personal and professional growth for the staff.

Integrated, cohesive curriculum. Having an inappropriate training curriculum, or no curriculum at all, will undoubtedly weaken a training program and reduce its chances of success and survival. A training curriculum is the next logical step after a needs analysis. Integration in a curriculum reflects how easily staff members can acquire appropriate and adequate training, both to meet specific job demands and fulfill personal-growth needs.

Each departmental curriculum should have a core comprising the training required by all staff members, no matter what their function. This core should be surrounded by other training to satisfy individual requirements.

Timeliness. Delivering training at the right time means, first, that the student is ready to receive the training and, second, that he will have an immediate or early opportunity to apply it. The longer the time between acquiring and applying a skill, the more likely some of it will be forgotten. The passing of time also blunts a student's enthusiasm: Zeal can quickly be followed by disappointment when training is not put to work in a timely manner.

Appropriateness and pertinence. These two characteristics apply to different aspects of training — the appropriateness of a training medium, for example. Whereas one target audience may be best suited for computer-based training or interactive video instruction, another group may require instructor-led classes.

Appropriateness may also apply to the student mix in a class. The effectiveness of training may diminish if technicians mix with other students or if senior-level people rub shoulders with entry-level students.

Pertinence means pertinence to one's job. Being given training that has little or no relevance to one's current job can be a strong demotivating force.

Adequacy. Adequacy implies that the training is neither too much nor too little. Being deluged with information that one does not really need negates the quality of the whole program. If a student has to struggle too hard to work out what he needs and does not need, the effort may encourage an inclination to discard all of it.

Verifiable knowledge and skill acquisition. The most common method of verifying that a student has learned what he was supposed to learn is simple classroom-style testing. However, this is probably not appropriate for the professional staff. The test for these system developers comes in how successfully they apply their knowledge on the job. Observation by peers and superiors and achievement of specific performance objectives are more conventional metrics.

While some form of verification is necessary, care must be taken to conduct it in a nonthreatening and subjective fashion. There must be acknowledgment of variations in learning ability and of plateauing, whereby staff members simply cannot absorb any more information.

Training-based corporate culture. The importance of training should be endorsed by the highest management levels. Training itself should not be restricted to job-related skills. Without exception, all staff members should be taught about the business of the company. They should be able to relate individual effort to companywide achievement.

Funding. Money, as always, plays a vital part in the success of training. Furthermore, it is another indication of management's commitment to fostering improvement and effectiveness through training. In times of austerity, training budgets are most susceptible to cuts. While it is not feasible for them to be untouchable, they should at least be treated fairly, accommodating only part of a budget reduction.

These success factors are by no means exhaustive. Rather, they are those that should be considered by default. Others might include effective follow-up training, usable feedback mechanisms, creative course packaging or customizing and training for trainers. Such critical success factors will favor the success of a training program and prevent it from becoming simply a haphazard activity.

Duncan is a quality assurance consultant at a large Dallas bank.

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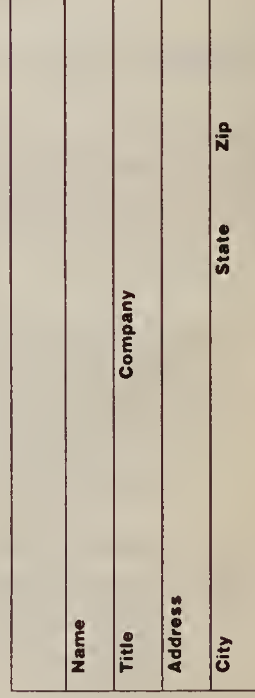

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"In just three weeks, our card in Computerworld's Card Deck generated over 300 leads — and many were from buyers whose leads quickly translated into sales."

— Gary Stevens
Vice President
Technology Solutions, Inc.

"We can help manage technological change." That's the charter of Technology Solutions, Inc., a marketer of PC products in Herndon, VA. According to Vice President Gary Stevens, ScriptWriter, the Electronic Clipboard, can help users do just that.

A portable piece of forms-processing hardware, ScriptWriter actually reads hand entries, storing data for electronic transfer to a mainframe, minicomputer, or PC. By eliminating hand keying, ScriptWriter offers faster, more accurate data entry and substantial cost savings. And with this new tool's virtually endless applications for data collection, Gary was faced with finding a way to promote to key buyers.

"First we looked at ways to build product awareness and generate leads. We chose card deck advertising. Based on our experience, card decks are a good response vehicle because they're quick to look through and easy to use.

"Then we chose *Computerworld's* Response Card Deck. I've subscribed to *Computerworld* for many years and I've always considered it to be the newspaper that hits high-level MIS/DP people — those who buy. Unlike PC books which are focused on gadgets for PCs only, *Computerworld* covers and reaches the whole MIS/DP industry.

"Our choice was definitely the right choice. In just three weeks, our card in *Computerworld's* Response Card Deck generated over 300 leads — more than double our original goal. And these were high-quality leads. We didn't get basic information collectors that local newspaper ads generally attract. We heard from professionals who were genuinely interested and had a real need for the product. And many were from buyers who quickly translated into sales.

"We were very pleased — and, admittedly, even a little surprised — with our success rate. But the message is clear. And, in the future when we're looking at dollars for advertising, our first dollars will definitely go to *Computerworld* Response Card Decks."

Computerworld Response Card Decks give you a cost-effective way to reach a powerful buying audience of over 127,000 computer professionals. They're working for Technology Solutions, Inc. — and they can work for you. Call Norma Tamburrino, Account Manager, *Computerworld* Response Card Decks at (201)967-1350 to reserve your space today.

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COMPUTERWORLD
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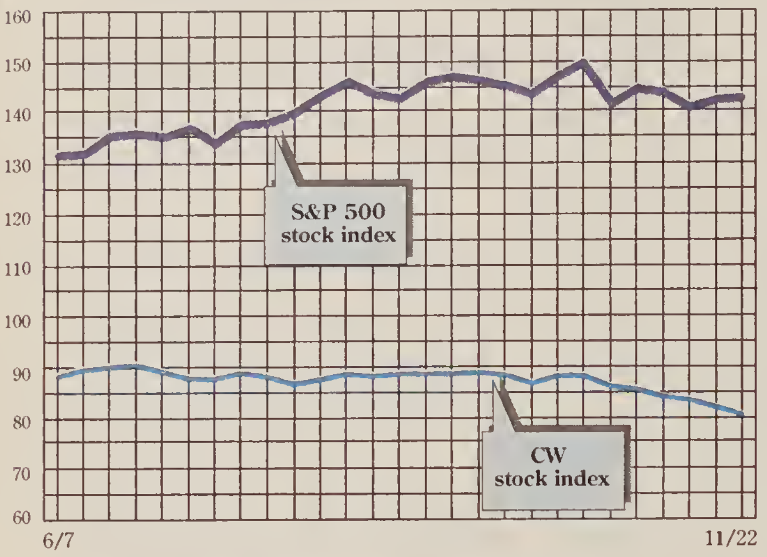
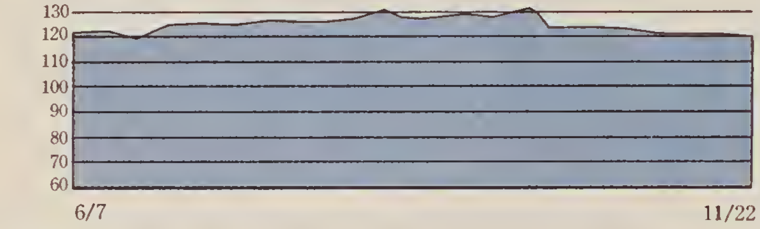
STOCK TRADING INDEX

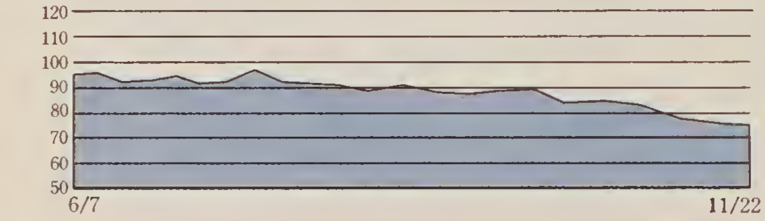


Indexes	*Last Week*	*This Week*
Communications	120.8	**120.0**
Computer Systems	76.2	**74.9**
Software & DP Services	113.8	**114.1**
Semiconductors	49.2	**48.3**
Peripherals & Subsystems	73.2	**72.2**
Leasing Companies	102.3	**100.2**
Composite Index	82.1	**81.1**
S&P 500 Index	142.5	**143.2**

Communications



Computer Systems



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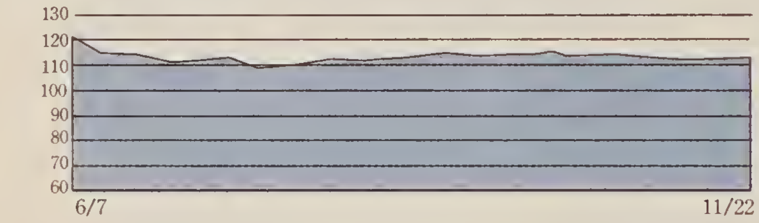
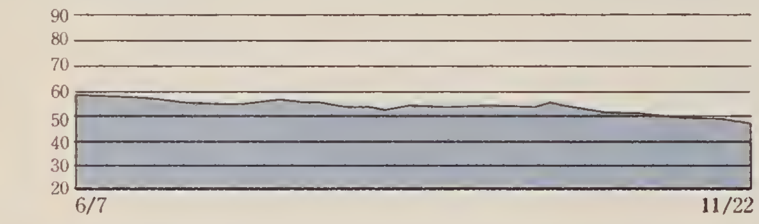
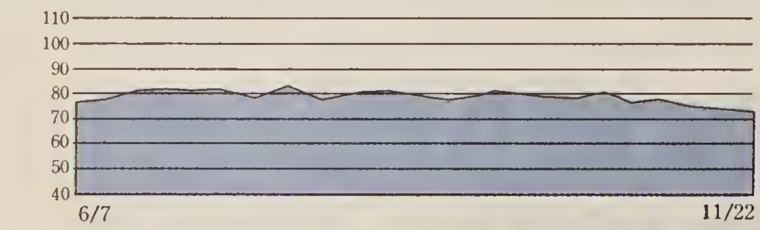


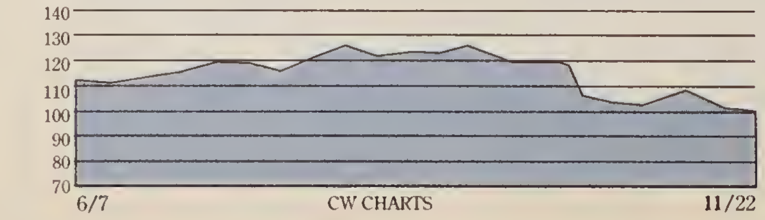
Semiconductors



Peripherals & Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, NOV. 21, 1989

Communications and Network Services

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	65	46	59.875	0.1	0.2
Q	ANDREW CORP	26	17	24.25	0.3	1.0
Q	ARTEL COMM CORP	9	2	5.875	-0.1	-2.1
N	AT&T	46	28	43.25	-0.1	-0.3
Q	AVANTEK INC	7	4	4.25	-0.5	-10.5
N	AYDIN CORP	21	14	16	-0.6	-3.8
N	BELL ATLANTIC CORP	105	69	102	-1.9	-1.8
N	BELLSOUTH CORP	55	39	51.625	-0.1	-0.2
Q	COMPRESSION LABS INC	11	3	7.625	-0.1	-1.6
Q	CONTEL CORP	37	18	30.125	-0.4	-1.2
Q	DATA SWITCH CORP	6	2	2.625	-0.1	-4.5
Q	DIGITAL COMM ASSOC	26	17	18.375	-1.1	-5.8
Q	DYNATECH CORP	21	16	16.75	-0.3	-1.5
Q	FIBRONICS INTNL INC	7	4	6.625	0.1	1.9
Q	GANDALF TECHNOLOGIES	7	4	5.375	0.1	2.4
N	GENERAL DATACOMM INDS	7	4	4.5	0.1	2.9
N	GTE CORP	67	43	65.25	-1.4	-2.1
Q	INFOTRON SYS CORP	13	8	8.75	0.3	2.9
N	ITT CORP	65	49	58.125	0.0	0.0
N	M A COM INC	9	5	5.875	0.3	4.4
Q	MCI COMMUNICATIONS CORP	49	20	45.375	1.1	2.5
N	NETWORK EQUIP TECH INC	28	14	25.75	-0.4	-1.4
Q	NETWORK SYS CORP	11	7	8	-0.3	-3.0
N	NORTHERN TELECOM LTD	23	14	21.75	-0.3	-1.1
Q	NOVELL INC	38	24	25.125	0.3	1.0
N	NYNEX CORP	84	65	81.125	1.1	1.4
N	PACIFIC TELESIS GROUP	47	30	43.75	-0.4	-0.B
A	PENRIL CORP	9	3	7.75	0.4	5.1
N	PLESSEY PLC	46	37	39.375	0.0	0.0
N	SCIENTIFIC ATLANTA INC	25	11	23.375	-1.4	-5.6
N	SOUTHWESTERN BELL CORP	59	39	53.875	-1.8	-3.1
Q	3 COM CORP	29	10	12	0.3	2.1
N	U S WEST INC	75	56	69.875	-1.4	-1.9

Computer Systems

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	7	3	5.75	-0.1	-2.1
Q	ALPHA MICROSYSTEMS	8	5	4.75	-0.3	-5.0
Q	ALTOS COMPUTER SYS	9	6	7.75	0.0	0.0
A	AMDAHL CORP	23	11	12.25	1.0	8.9
Q	APPLE COMPUTER INC	50	34	45.25	1.0	2.3
N	BOLT BERANEK & NEWMAN	13	6	7	0.6	9.8
N	COMPAQ COMPUTER CORP	113	52	92.375	1.4	1.5
N	COMMODORE INTNL	20	7	7.375	0.1	1.7
Q	COMPUTER AUTOMATION INC	7	2	1.938	-0.4	-18.4
N	CONTROL DATA CORP	24	17	17	-0.5	-2.9
N	CRAY RESH INC	66	32	32.125	-0.8	-2.3
Q	DAISY SYS CORP	7	0	0.625	-0.2	-23.1
N	DATA GEN CORP	20	13	13	-0.8	-5.5
N	DATAPOINT CORP	6	3	4.125	0.3	6.5
Q	DELL COMPUTER CORP	12	5	6	0.4	6.7
N	DIGITAL EQUIP CORP	122	84	88.875	3.6	4.3
N	FLOATING POINT SYS INC	4	1	1.5	0.0	0.0
N	HARRIS CORP	40	25	33.875	-2.0	-5.6
N	HEWLETT PACKARD CO	62	40	44.375	3.3	7.9
N	HONEYWELL INC	92	57	80.75	0.0	0.0
N	IBM	131	96	99.5	1.6	1.7
Q	INFORMATION INTL INC	16	12	12.5	-0.5	-3.8
Q	IPL SYS INC	9	4	6.5	-0.6	-8.8
N	MAI BASIC FOUR INC	11	3	3.375	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	204	154	156.5	-2.0	-1.3
Q	MENTOR GRAPHICS CORP	22	13	15.25	0.0	0.0
N	NBI INC	3	1	0.688	0.1	10.1
N	NCR CORP	67	51	61	0.6	1.0
N	PRIME COMPUTER INC	21	7	7.125	-0.1	-1.7
Q	PYRAMID TECHNOLOGY	20	9	16.75	0.3	1.5
Q	SEQUENT COMP SYS INC	19	8	17.5	-0.6	-3.4
Q	SHAREBASE CORP	4	0	0.25	-0.3	-55.6
Q	SILICON GRAPHICS CORP	27	14	23.75	1.3	5.6
Q	STRATUS COMPUTER	35	21	23.5	0.3	1.1
Q	SUN MICROSYSTEM INC	23	13	15.625	0.0	0.0
Q	SYMBOLICS INC	3	1	1.5	0.0	0.0
N	TANDEM COMPUTERS INC	26	15	23.375	-0.9	-3.6
N	TANDY CORP	49	38	42.125	0.9	2.1
N	ULTIMATE CORP	12	7	8	-0.1	-1.5
N	UNISYS CORP	31	12	14.375	1.0	7.5
A	WANG LABS INC	11	5	5	-0.4	-7.0

Software & DP Services

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ADOBE SYS INC	30	14	18.75	1.0	5.6
Q	AMERICAN MGMT SYS INC	19	11	13	-0.3	-1.9
Q	AMERICAN SOFTWARE INC	23	10	21.25	-0.9	-4.0
N	ANACOMP INC	9	4	4.375	-0.4	-7.9
Q	ANALYSTS INTL CORP	20	8	17.25	-0.3	-1.4
Q	ASHTON TATE	24	9	9.625	0.0	0.0
Q	ASK COMPUTER SYS INC	18	7	7.875	0.5	6.B
N	AUTO DATA PROCESSING	51	36	48	1.1	2.4
Q	AUTODESK INC	44	24	39.25	0.3	0.6
Q	BMC SOFTWARE INC	29	9	28.75	1.4	5.0
N	BUSINESSLAND INC	15	9	9.5	0.0	0.0
Q	COGNOS INC	9	4	4.25	0.0	0.0
N	COMPUTER ASSOC INTL INC	22	11	12.375	0.4	3.1
Q	COMPUTER HORIZONS CORP	11	7	8.5	0.1	1.5
N	COMPUTER SCIENCES CORP	57	44	55	0.9	1.6
N	COMPUTER TASK GROUP INC	16	10	10.125	-0.1	-1.2
Q	COMSHARE INC	42	19	33	-0.3	-0.8
Q	CORPORATE SOFTWARE	16	9	B.5	-1.0	-10.5
N	CULLINET SOFTWARE INC	10	5	D.01	0.0	0.0
N	GENERAL MTRS (CLS E)	58	40	54.75	-2.4	-4.2
Q	HOGAN SYS INC	7	4	4.75	-0.3	-5.0
Q	INFORMIX CORP	15	7	13.625	-0.4	-2.7
Q	INTELLICORP INC	6	3	4.875	0.3	5.4
Q	LEGENT CORP	32	18	26	0.3	1.0
Q	LOTUS DEV CORP	34	17	32.375	1.5	4.9
Q	MANAGEMENT SCI AMER	18	7	18.125	6.4	54.3
Q	MICROSOFT CORP	89	46	88.125	-0.4	-0.4
Q	NATIONAL DATA CORP	35	19	32	0.3	0.8
N	ON LINE SOFTWARE INTL INC	9	5	8.75	-0.1	-1.4
Q	ORACLE SYS CORP	26	8	22.875	-2.1	-8.5
N	PANSOPHIC SYS INC	18	12	15.25	0.4	2.5
Q	PHOENIX TECHNOLOGIES INC	19	3	4	0.1	3.2
Q	POLICY MGMT SYS CORP	38	22	36.5	-0.3	-0.7
Q	PROGRAMMING & SYS INC	21	15	21	0.3	1.2
Q	RELATIONAL TECH INC	16	5	5.875	-0.3	-4.1
N	REYNOLDS & REYNOLDS CO	34	21	24.75	0.0	0.0
Q	SAGE SOFTWARE INC	11	7	9.375	-0.1	-1.3
Q	SEI CORP	20	16	18.125	0.0	0.0
Q	SHARED MED SYS CORP	19	13	13.25	-0.1	-0.9
Q	SOFTWARE PUBG CORP	21	10	15.5	-8.6	-35.8
A	STERLING SOFTWARE INC	9	5	8	0.4	4.9
Q	SUNGARD DATA SYS INC	24	13	22.75	0.9	4.0
Q	SYSTEMATICS INC	40	26	33	-1.3	-3.6
N	SYSTEM CENTER INC	26	14	18.375	-0.1	-0.7
N	SYS. SOFT INC	30	14	27.25	1.3	4.8
Q	WORDSTAR	3	2	1.625	-0.3	-13.3

Semiconductors

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	11	7	7.625	0.1	1.7
N	ANALOG DEVICES INC	13	8	8.25	-0.4	-4.3
Q	ANALOGIC CORP	11	7	9.25	-0.1	-1.3
Q	CHIPS & TECHNOLOGIES INC	26	11	18	-1.3	-6.5
Q	INTEL CORP	35	19	33.5	-0.3	-0.7
Q	MICRON TECHNOLOGY INC	26	10	10.125	-1.4	-12.0
N	MOTOROLA INC	63	36	57.625	1.1	2.0
N	NATL SEMICONDUCTOR	10	6	6.5	-0.1	-1.9
N	TEXAS INSTRS INC	47	28	31.75	2.0	6.7
A	WESTERN DIGITAL CORP	15	6	6.625	-0.3	-3.6

Peripherals

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	3	1	1.375	-0.2	-12.0
N	AM INTL INC	6	5	5.375	0.0	0.0
Q	AST RESH INC	11	7	10.125	0.4	3.8
Q	AUTO TROL TECH CORP	6	4	3.75	0.0	0.0
Q	BANCTEC INC	20	9	15.625	1.0	6.8
Q	CIPHER DATA PRODS INC	11	4	4.75	-0.1	-2.6
A	COGNITRONICS CORP	8	2	6.125	-0.4	-5.8
Q	CONNOR PERIPHERALS	16	7	13.125	0.1	1.0
A	DATAPRODUCTS CORP	18	8	8	-0.1	-1.5
A	DATARAM CORP	12	7	8.5	-0.1	-1.4
N	EASTMAN KODAK CO	52	41	42	-0.6	-1.5
N	E M C CORP MASS	6	3	3.875	-0.3	-6.1
Q	EMULEX CORP	12	5	6.625	0.1	1.9
Q	EVANS & SUTHERLAND	25	14	24.75	1.8	7.6
Q	ICOT CORP	3	1	1.375	0.0	0.0
Q	INTERLEAF INC	10	5	6	-0.1	-2.0
Q	IOMEGA CORP	5	2	3.25	0.1	1.9
Q	LEE DATA CORP	4	1	1.375	-0.1	-8.3
Q	MASSTOR SYS CORP	4	2	2.438	0.1	2.7
Q	MAXTOR CORP	12	7	9.625	-0.5	-4.9
Q	MICROPOLIS CORP	9	3	4	0.0	0.0
Q	MINISCRIBE CORP	9	1	0.938	-0.3	-26.8
N	MINNESOTA MNG & MFG CO	80	59	75.5	1.0	1.3
Q	PERSONAL COMP PRODUCTS INC	6	4	4.25	0.0	0.0
Q	PRIAM CORP	2	0	0.063	0.0	0.0
Q	PRINTRONIX INC	10	7	10	-0.4	-3.6
N	QMS INC	12	6	10.875	0.4	3.6
Q	QUANTUM CORP	17	4	11	-0.5	-4.3
N	RECOGNITION EQUIP INC	13	6	7	0.5	7.7
Q	REXON INC	8	6	6	-0.4	-5.9
Q	SEAGATE TECHNOLOGY	16	7	13.375	0.0	0.0
N	STORAGE TECH CORP	23	9	12.375	-0.3	-2.0
Q	TANDON CORP	1	0	1	0.1	6.6
N	TEKTRONIX INC	24	16	16.875	0.0	0.0
Q	TELEVIDEO SYS INC	1	0	0.375	-0.1	-14.4
N	XEROX CORP	69	54	57.25	-0.4	-0.7

Leasing Companies

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 21, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMPLICON INC	115	11	11.5	0.0	0.0
N	CAPITAL ASSOC INTNL INC	9	4	4.375	0.0	0.0
N	COMDISCO INC	34	19	24.75	-0.1	-0.5
Q	CONTINENTAL INFO SYS	3	0	0.344	0.0	-8.3
Q	LDI CORPORATION	18	12	17	-0.3	-1.4
Q	PHOENIX AMERN INC	5	3	3.75	0.1	3.4
Q	SELECTERM INC	9	5	6.5	-0.4	-5.5

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Good buy

Patience pays off for MSA; it passed one deal for a better one

A promising deal can do wonders for your financial outlook. Management Science America, Inc. investors seemed to like what they heard about The Dun & Bradstreet Corp.'s acquisition of the application software maker (see story page 1). MSA, which last year rejected a lower offer from Computer Associates International, Inc., shot up 6 points to close at 18⅛ in the middle of the short holiday week.

Compaq Computer Corp. Chairman Ben Rosen told analysts that he expects the personal computer market to remain strong despite the recent sales slowdown. Compaq climbed 1¾ points to close at 92⅜. Lotus Development Corp. announced a factory-floor tool for use with its 1-2-3 mainstay software package. Lotus in turn added 1¼ points to finish at 32⅜.

MCI Communications Corp., which recently won a $150 million contract with the International Carrier Group, four smaller long-distance companies, ended at 45⅜, up 1¼ points. Digital Equipment Corp. closed at 88⅞, up ⅝ of a point. IBM inched up ⅜ of a point to 99½. Hewlett-Packard Co. reported that its fourth-quarter earnings would be up slightly, despite costs incurred by its acquisition of Apollo Computer, Inc. HP finished at 44⅜, down ⅛ of a point.

JOSEPH J. FATTON

D&B

FROM PAGE 1

at all, have yet to be disclosed, customers did not think the merger would have any short-term effect on their operations. However, most agreed that the new company would eventually have to choose one product line.

"It will be interesting to see how they meld the two" product lines, said Peter Pelos, director of accounting services at Ciba-Geigy Corp.'s pharmaceuticals division. Pelos, an MSA customer, had recently considered some M&D products. He said he hoped that some of the features he found attractive in the M&D products might be brought over to MSA's applications. Pelos was also hopeful that the combined company would move faster in such areas as electronic data interchange.

All existing MSA and M&D product lines will be maintained, supported and enhanced, according to Imlay, M&D President Frank Dodge and a D&B spokesman. Both MSA headquarters in Atlanta and M&D headquarters in Natick, Mass., will continue to operate; Dodge and Imlay will remain in place as presidents of their respective companies as well as vice-chairman and chairman, respectively, of the group. While IBM Systems Application Architecture-compliant software is the major focus of both companies, Dodge and Imlay each stressed that customers of M&D's Digital Equipment Corp.-based software have nothing to fear from the new alliance.

Peter Ostergard, director of systems planning and development at A. H. Robins Co.in Richmond, Va., said he thought the combined company would probably end up with the two product lines and provide migration tools for customers.

"I don't have any real problem with that," he said. According to Ostergard, A. H. Robins was "MSA customer number 003," having installed some of the first MSA products in the mid-1970s. Looking at the wave of computer industry mergers, he added, "It depends on who is buying and what their intent is. In some cases, mergers and acquisitions are a good thing."

Crotty added, "Both M&D and MSA want to have a common architecture," and that fits well with Travelers' strategy. In contrast, he pointed to CA's seemingly haphazard acquisition style, which has resulted in what he characterized as a "warehouse" supplier.

According to D&B, holders of some 40% of MSA's 18 million outstanding shares have already agreed to the buyout: Among them are Imlay, who owns approximately 2.9 million shares, and IBM, which was a 5% equity owner of MSA as of last May.

IBM keeps stake

Even after it tenders its stock, IBM will retain a stake of sorts in the new entity. J. William Scruggs, director of business development at IBM, will sit on the D&B Software Services board, along with D&B Executive Vice-President Volney Taylor, Imlay and Dodge.

"I've been telling [MSA stockholders] to take the money and run," said Charles E. Taylor Jr., who follows the company at Prudential-Bache Research. He and his Wall Street brethren generally viewed the $333 million figure as a generous but not outrageous offering price for MSA, which in the past year has pruned, pared and focused its way back into the black after two years of losses.

"What it really is, is a merger of equals, very much like Legent," Imlay said, comparing the coupling to that of systems software houses Duquesne Systems, Inc. and Morino Associates earlier this year — widely viewed as one of the healthier among the recent combinations in the computer industry.

Analysts viewed the deal as strategically sound and promising from the product synergy standpoint. However, some observers were skeptical as to the all-gain, no-pain scenario painted by the respective companies.

"Boy, are there overlapping costs to be saved in merging MSA with M&D — that is, if they have the resolve and the fortitude," said Stephen McClellan, an analyst at Merrill Lynch & Co. McClellan also voiced qualms about the two-president, dual-headquarters executive structure currently planned for the new D&B unit. "What doesn't make sense is having a two-headed Hydra," he said.

Investors warm to D&B's tune

In July 1988, when shareholders in droves backed Management Science America, Inc.'s refusal to entertain a takeover bid from competitor Computer Associates International, Inc. (CA), MSA Chairman John P. Imlay Jr. chalked it up as "a very clear indication that our shareholders value their independence" and an unmistakable demonstration "that our shareholders share a common belief in the bright future of MSA."

Last week, with information giant The Dun & Bradstreet Corp. (D&B) offering $18.50 a share for MSA stock, which traded a week earlier at $10 to $11, at least 40% of those stockholders — including IBM, which bought a 5% stake in MSA last spring, and Imlay, who owns some 2.9 million shares — decided that MSA's brightest future lies in ownership by D&B.

The deal could prove a rich one for both companies' users as well as for investors, according to analysts, who said they saw fertile opportunities for synergy between companies whose resources might be better deployed attacking the need for IBM Systems Application Architecture-compliant software than attacking each other.

However, several analysts said last week that the benefit to users, while real, might be slower to kick in than the investors' immediate cash premiums.

"Some of the customers are going to freeze," predicted Mark Finley, an analyst at Soundview Financial Corp. in Stamford, Conn. Both MSA and McCormack & Dodge customer rolls include companies that also have had products made by Cullinet Software, Inc., which was acquired by CA in September.

In the wake of that deal's closing, the fate of several Cullinet products is reportedly in abeyance.

In last week's announcement, D&B pledged to continue and enhance all extant M&D division and MSA products. However, Finley said, CA made similar promises. Morever, newly sophisticated in a merger-mad market, users are all too aware that any corporate recombination might mean a temporary disruption of services and support.

Users and analysts also questioned MSA and M&D's promises that there would be no layoffs stemming from the merger.

"That's just standard verbiage," noted The Travelers Corp.'s Director of Financial Services Jim Crotty, on the no-layoffs claim. "I have never seen a buyout without some cuts."

NELL MARGOLIS AND AMY CORTESE

Gillette

FROM PAGE 1

they designed the new razor and cartridge, some 50 others were using CAD to design all of the new factory-floor machines to produce the Sensor.

"Not everyone was up to speed at first, and some engineers resisted using CAD," Valorz said. "But once they got moving, it was like a freight train."

Valorz said that without three-dimensional CAD, the time from concept to finished design is three years, rather than 18 months. To meet its deadline without CAD, Gillette would have had to pay many more designers to do it.

With intense deadline pressures, Gillette's ability to modify designs on screen and share drawings electronically paid off in unanticipated ways. At one point, Valorz was working with a Canadian design firm on a die tool.

"In the past, if I tried to mail drawings or tapes to Canada, they always got stuck in Customs for three days," he said. "Twice, the magnetic tapes were mistakenly X-rayed by Customs, and the data was destroyed. [With CAD,] we transmitted the designs over the telephone and resolved the issues within an hour."

On the factory floor at Gillette's Boston headquarters, Sensor presented a daunting information management challenge. Each razor is the product of 157 raw materials, 39 finished components and 34 assembly processes — 230 discrete items to be managed, virtually all of them different from Gillette's other razor lines.

"The only common thing is the raw steel for the blade," said Herbert Bomengen, division manager of materials management at Gillette's Shaving Division.

AMAPS, running on an IBM 3090 Model 200, is the nucleus of a completely revamped production system brought on-line in early 1988 to support all of the company's North American shaving products manufacturing. The system also includes factory-floor data collection, with programmable logic controllers transmitting data to the host VAX on quality parameters, such as the proper angle of the blades in the cartridge.

Bomengen headed the team charged with implementing AMAPS. The team was a cross-functional group with representatives from accounting, purchasing and production as well as IS management.

"These types of large projects are always headed by a person from the user organization," said Systems Manager Joseph Egan, the IS representative. "Our organizational philosophy is well established — we work for the users. The IS people act as consultants or advisers, helping the users define the needs."

STEVEN LEWIS

K. C. Gillette's *likeness keeps a sharp eye on Valorz (left) and Bomengen*

User-led project teams are one of the reasons why Gillette was rated the most effective user of IS in the consumer products industry in the 1989 *Computerworld* Premier 100.

"We're seeing more and more clients making a line manager responsible for the overall success of the project," said Herbert W. Perkins III, a principal at Lexington, Mass.-based IS consultancy Nolan, Norton & Co. "The technology is important, but the organizational change is probably more important."

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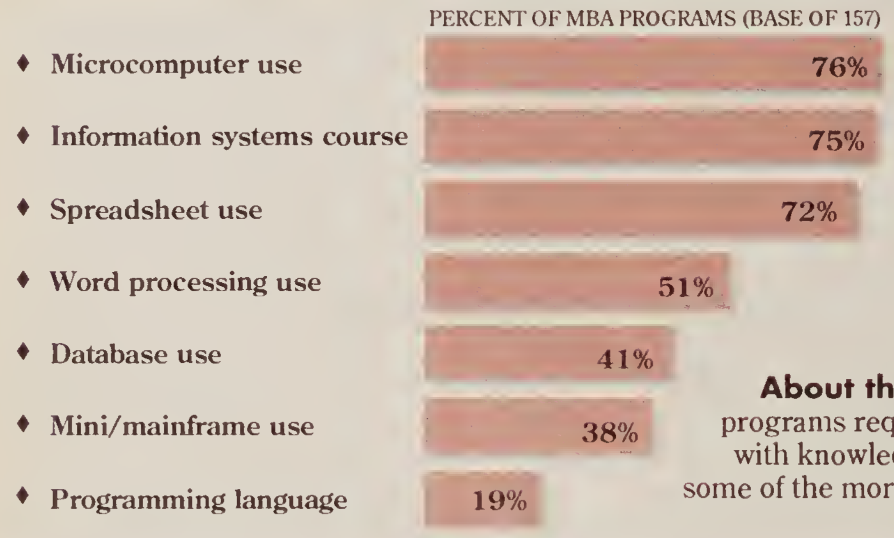
TRENDS

Business school computer usage

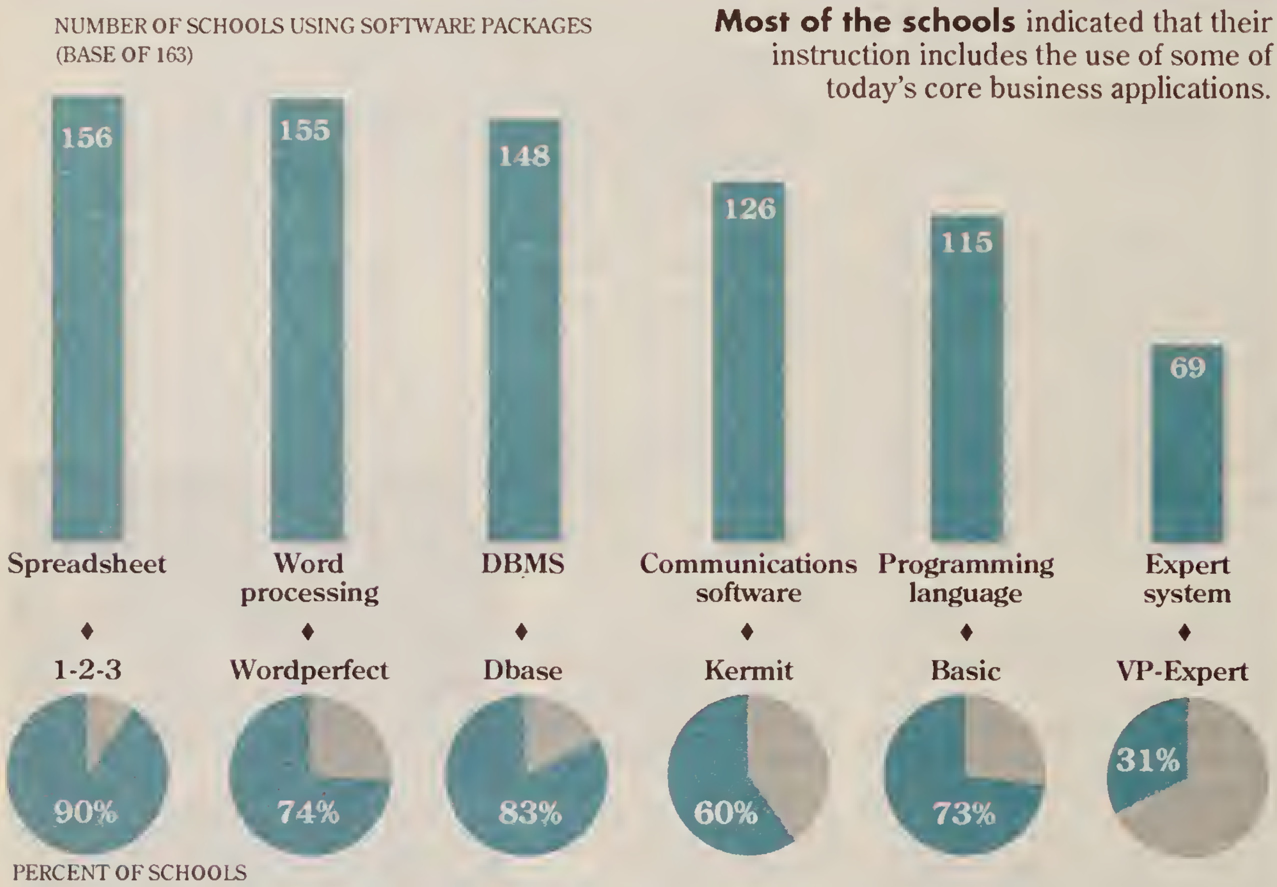
A survey of business schools conducted by the School of Management at UCLA shows what tomorrow's executives are learning today

Computer requirements and expectations upon graduation



About three quarters of the MBA programs require that students graduate with knowledge of microcomputers and some of the more fundamental applications.

PC software used for instruction and principal packages used



Most of the schools indicated that their instruction includes the use of some of today's core business applications.

SOURCE: SCHOOL OF MANAGEMENT AT UCLA, LOS ANGELES, CALIF.

CW CHARTS: JOHN YORK

NEXT WEEK

Robert G. Wallace, the recently retired president of Phillips 66 Co. and executive vice-president of its parent company, Phillips Petroleum Co., is one of the most tireless advocates of executive computing. Executive Report examines current levels of computer use by top executives and the impact it can have on business operations.

STEVE JENNINGS/PICTURE GROUP

Headache time. That technical guru you hired to consult on your big project talks more like a musty old textbook than the clear, expert voice you need. How do you get him to talk English to the right folks? How do you get your money's worth without offending a valuable resource? Look for some practical (and literary) relief in In Depth.

INSIDE LINES

What's the definition of 'immediate'?

Well, one potential IBM 3090 J model customer was unhappy last week when he checked on his delivery date and discovered the best IBM had to offer him was sometime next year. Engelhard Corp. in Iselin, N.J., had a 3090 S model on order, which was supposed to be automatically rolled over to a J. It was. But the catch is it will not be coming anytime soon. "I'm running around in circles trying to get a delivery date," said information systems director Steven Pook. The J models, announced last month, had been scheduled for immediate availability.

Disk drive start-up — sort of

Unisys is preparing to sell its 1,800-employee Santa Clara, Calif., disk-drive operation to a group of its plant managers. The leveraged buyout would result in a new company, called Sequel, Inc., and help Unisys achieve its goal of cutting about 8% of its 93,000-person work force.

Hey, they're only numbers

Sun Microsystems claims that more than 1,400 Sparcware applications are now available. Funny thing is, in its annual report issued last month, the company said 750 Sparcware applications were available and expected to see new ones emerging at the rate of one a day through the rest of 1989. Imagine its surprise when almost 16 times that amount began arriving.

A trend in the making

An outsourcing users group? Why not? Several clients of Genix Enterprises, the Pittsburgh-based provider of outsourcing services, have been discussing the possibility of forming one. Among the issues of common concern is the pricing structure when a particular software application on the vendor's CPU is shared among several IS customers.

Will it be just in time?

Network Application Services, DEC's multivendor interoperability panacea, is being extended to the factory floor as well. One of the vehicles will be Basestar, a suite of applications for coordinating information among various shop-floor devices in the discrete manufacturing sector, which will be expanded to include other (i.e., process) sectors and enhanced to include NAS services such as common document architecture and the Motif user interface, a DEC spokesman claims.

The yin and the yang

There's good news and bad news on the AS/400 front. Apparently, IBM is hitting its revenue projections for the year on its flagship midrange line. But unit shipments are way off, according to ADM, a market research firm in Cheshire, Conn. Dave Andrews, president of ADM, says IBM will miss its unit target by as much as a third because it's just not moving the low-end boxes like it thought it would. However, it also sold far more high-end units than expected, which is what is saving it when it comes to revenue goals. ADM says IBM was expecting to ship between 20,000 and 25,000 units in the U.S. this year but will likely ship about 15,000.

Just when was that deal locked up?

(We keep a file of quotables for instances such as this.) Microsoft, with a push from IBM and Presentation Manager developers, these days is clearly telling users when and where to use Windows and when to go up to the next generation, but it wasn't always that way. The November/December issue of *Aldus Magazine* includes a September interview with Steve Ballmer, Microsoft's vice-president of systems development, that shows Microsoft was thinking a bit differently just two months ago. He predicted that business users will migrate to OS/2 over time and added that "we want the users to decide when it makes sense for them to move." Not any more.

If you want to win some money in Vegas, just let Mark Eppley know what happened to Mo. It seems that Mo — a life-size Superman inflatable adorned with a mohawk wig — was kidnapped from Travelling Software's post-Comdex "burnout" party. Company President Eppley wants Mo back in his office. If you know Mo and his location, call the hot line at 800-343-6474 and we'll act as an intermediary in the negotiations.

"I suppose, Dorfman, in its broadest sense, you could call this networking."

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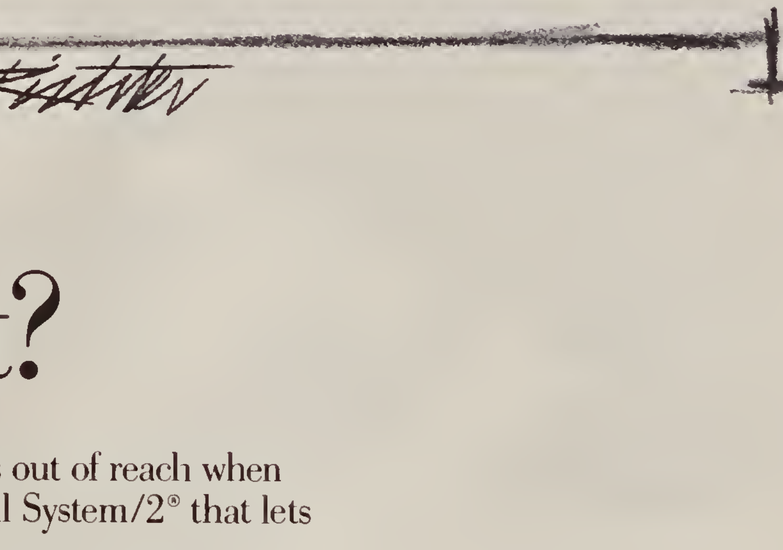

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